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The Dental Digest

December 1931

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GEORGE WOOD CLAPP, D. D. S.
Publisher~THE DENTISTS' SUPPLY COMPANY *of New York*

THE DENTAL DIGEST

VOLUME XXXVII DECEMBER, 1931 NUMBER 12

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THE DENTAL DIGEST

GEORGE WOOD CLAPP, D.D.S., EDITOR

ALLAN M. JOHNSON, A.B., D.M.D., ASSOCIATE EDITOR

Published monthly, by THE DENTISTS' SUPPLY COMPANY OF NEW YORK, 220 West 42nd Street, New York, U. S. A., to whom all communications relative to subscriptions, advertising, etc., should be addressed.

Subscription price, including postage, $1.00 per year to all parts of the United States, Philippines, Guam, Cuba, Porto Rico, Mexico, and Hawaiian Islands. To Canada, $1.40. Great Britain and Continent, $2.75. Australia, $3.25. To all other Countries, $1.75.

Articles intended for publication and correspondence regarding the same should be addressed EDITOR DENTAL DIGEST, Candler Bldg., Times Square, 220 West 42nd Street, New York, N. Y.

The editor and publishers are not responsible for the views of authors expressed in these pages.

Entered as Second Class Matter, at the Post-office at New York City, N. Y., January 29, 1909, under the Act of Congress, March 3, 1879.

THE DENTAL DIGEST

VOLUME XXXVII DECEMBER, 1931 NUMBER 12

Replacement With Artificial Teeth Immediately After Extraction

CASE HISTORY, MODIFIED SURGICAL PREPARATION, AND CONSTRUCTION OF IMMEDIATE DENTURE

By CHARLES I. STOLOFF, D.D.S., New York, N. Y.

A host of teeth which should be removed from patients' mouths are retained because of the fear of remaining toothless. This state of mind has been fostered by the majority of the dental profession, who tell patients that they must wait "until the gums heal" before teeth are inserted. The idea that a period of time must elapse before a denture is inserted is erroneous and must be changed if we are to serve our patients' best interests properly, and incidentally our own. With human nature and the average individual's attitude toward dentistry as they are, the vision of sunken lips and cheeks, abstinence from real food and enforced retirement for a period of time from business and social life are certainly no cheerful prospect and can well be sufficient cause for encouraging negligence regarding the removal of teeth.

Delay has frequently proved very costly to the health of patients in maintaining contaminating foci of infection and costly to their purses and comfort by inviting complications of restoration.

There is no doubt that, in addition to those whose teeth should be removed for health reasons, there are a great number of individuals who would be much happier if their crooked or abnormally positioned teeth were removed and replaced with an esthetic, well aligned and proportioned set of artificial dentures. I refer to those individuals whose dental abnormalities, the result of neglect or dental abuse, are beyond orthodontic adjustment. Irreparable mental havoc is frequently wrought in such people as a result of the self-consciousness arising from an unpleasant distortion of the profile and an unattractive smile. A complete change and improvement of temperament and a more cheerful outlook upon life generally are the gratifying results of esthetic dental restoration in such cases.

Teeth which are removed in anticipation of making a full denture may be and should be *immediately replaced before the patient leaves the office.* Reasons for this procedure additional to those cited above will be mentioned further on. The following case will illustrate the procedure employed by the author for immediate denture service.

Case History

The patient, Mrs. G. S., aged 35, a voluntary social worker and leader in public-spirited women's organizations, called at the office for a complete diagnostic examination, which included the taking of her physical history, a series of fourteen x-rays, transillumination, electric pulp-test, examination of gum, occlusion, dental and oral tissues. She gave a history extending several years back of rheumatic pains in her arms and feet. One year previously she had had a mild pyelitis. Two years previous to my examination she had been referred to a heart specialist who treated her for irregular heart-beat. He had advised removal of all suspicious foci of infection, of which her teeth appeared to be the most obvious ones. It was suggested that her teeth might be producing the heart lesion and the general symptoms of malaise and rheumatic pains. Several mandibular teeth had been removed at that time. The patient disliked the idea of having all of them removed because of her social and philanthropic activities, fearing that the period of toothlessness after the removal of the natural ones would necessitate retirement for a considerable

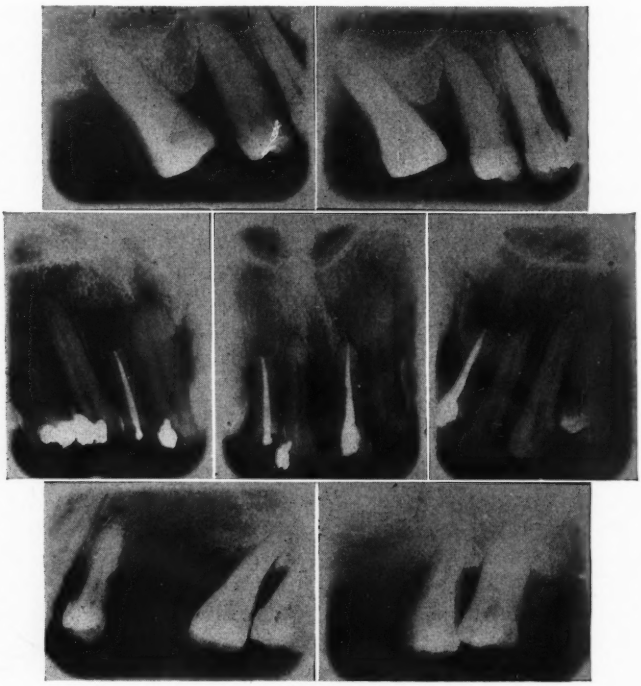


Fig. 1
Radiographs of maxilla and teeth before operation.

period of time. The thought of wearing "false" teeth did not exactly please her, either. The removal of the teeth was therefore deferred until the discomforting aches and pains made it imperative to take some measures to seek relief.

The diagnostic examination revealed a generalized destruction of almost two-thirds of the alveolar tissues supporting the teeth, with an acute exacerbation of the pyorrheal infection surrounding the right maxillary first and second bicuspids and an actively discharging fistula on the buccal side between the teeth. The right maxillary second and third molars and the left maxillary second molar had very actively discharging pyorrheal pockets enveloping their roots almost completely. The right maxillary lateral incisor and the left maxillary central incisor were pulpless, with a suspicious history (Fig. 1). The patient, a very intelligent individual, saw the wisdom of the suggested removal of her teeth, but nevertheless hesitated to have it done. Upon assurance that there would be no protracted period of toothlessness, she consented.

After careful checking up of the patient's existent physical condition the following steps were taken in preparation for the removal of the teeth and replacement with a denture. A profile outline record was made by pressing a strip of 16-gauge fuse wire against the median line of the face, starting at the highest point of the forehead and moulding it downward against the nose, the lips, around and below the chin. The fuse wire was placed against a piece of cardboard, the outline traced and cut out. The cardboard

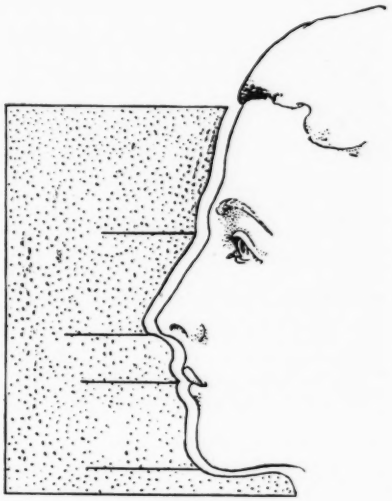


Fig. 2
Cardboard profile cut-out placed against the face for check-up (diagrammatic).

cut-out (Fig. 2) was placed against the patient's profile to check discrepancies, and the measurements desired for future guidance were marked and filed away for reference.

A modeling compound impression of the labial surfaces of the maxillary and mandibular anteriors in central occlusion was then taken (Fig. 3). When

Fig. 3
Modeling compound labial impression.

Fig. 4
Palatal view of study model, showing palatal areas to be relieved.

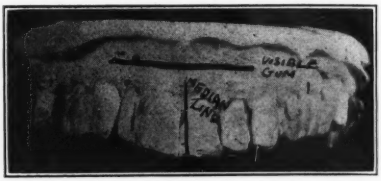


Fig. 5
Front view of study model, showing median line and line of gum visibility while smiling.

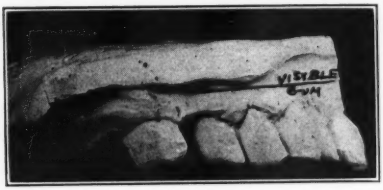


Fig. 6
Side view of study model.

poured, this impression furnishes an index of any deviation from a normal condition which may have existed in the teeth relationship before their removal.

Three sets of impressions of the maxillary and mandibular teeth were next obtained. The first impression was taken in modeling compound and was laid aside until the teeth were removed. The second impression, also taken in modeling compound, was poured in artificial stone and articulated. A third impression was very exactingly taken, especially as regards the palatal portion in the maxillary denture.

The model made from the second impression is used for study purposes (Figs. 4-6). In the case illustrated, notations and markings were made of the anatomical areas of interest in the denture construction, as well as the amount of natural tooth structure and gum visible during speech and while smiling, the individual angulation of the anterior teeth, especially the right ones (which were more prominent than the left), the spacing and shades of the individual anterior teeth and the amount of tissue which was to be trimmed and removed. All such details prove important in reproducing the general aspect of the patient's natural teeth and their arrangement. Although this particular case afforded opportunity for a rapid transformation of the facial contours through the medium of the artificial denture, the desired result was brought about slowly and with caution.

The second denture accomplished the desired result. It will be noted from the photographs of the immediate denture in this case (Figs. 7-9) that the arrangement of the teeth was almost

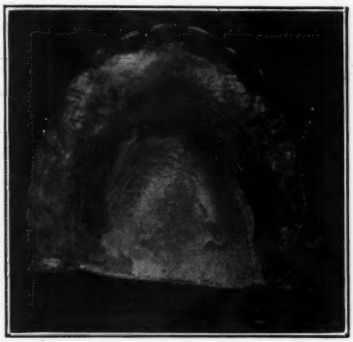


Fig. 7

Palatal view of immediate denture, showing the anterior teeth set at a more obtuse angle to occlusal plane than the natural teeth (see Fig. 13) and the posterior bite-blocks.

Fig. 8

Front view of immediate denture, showing set-up similar to natural teeth.

Fig. 9

Side view of immediate denture, showing reduction of anterior protrusion.

exactly similar to that of the natural ones except that the artificial central incisors were set at a more obtuse angle than the natural ones. This accomplished a marked cosmetic improvement, reducing the protrusion of the upper lip without conspicuously changing the general aspect of the facial contour. No drastic reconstruction of the facial contours should be made too suddenly. If it is indicated, it should be made gradually through the medium of several successive dentures instead of through the use of one denture which makes a sudden change in appearance.

The third impression must be skillfully prepared, for upon the model made from it (Fig. 10) is constructed the patient's first introduction to artificial dentures. In a full maxilla restoration we depend upon the accurate fit of the denture against the palate for its retentional qualities. The teeth portions of the third impression were poured in model plaster, and the palatal portion was poured in quick-setting stone.

After the above-mentioned preparatory measures had been taken, the patient was dismissed and another appointment arranged.

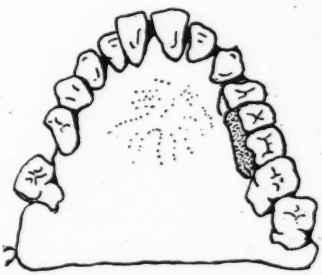


Fig. 10

Diagrammatic drawing of model made from the third impression. Teeth had been poured in plaster, model in stone.

Modified Surgical Procedure

In this case, as in others in which posteriors of both sides as well as the anterior teeth are to be removed in anticipation of constructing a full denture, the usual technic of removing all the teeth at one operation is modified, the surgery being performed in two sittings. At the first surgical session the posterior teeth are removed, at the second the anteriors. This procedure is especially indicated when the patient is a busy person who must constantly

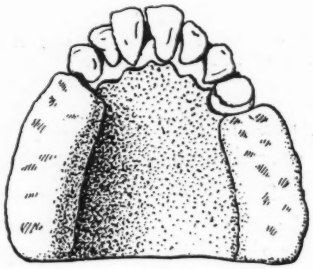


Fig. 11

Model without the posterior teeth. Immediate denture base and posterior bite-blocks.

appear in public. In addition to the convenience for the patient and the avoidance of surgical shock from the prolonged session sometimes necessary in removing all the teeth from the jaw at one time, it offers the advantage of eliminating all possible error in reproducing the exact jaw relationship. The posterior bite-blocks of sealing-wax which I use upon my immediate dentures are built up to the bite while the natural anterior teeth are still in place, so that the teeth act as definite guides in maintaining the desired height of the bite (Fig. 11). At this point, while the posterior bite-blocks are being adjusted, the baseplate for the immediate denture base can be accurately adapted to the palate and the post-damming area. Prior to the removal of the remaining anterior teeth there has been thus prepared an accurately fitted immediate denture of proper occlusal height. It then becomes a simple procedure to add the anterior teeth to the immediate denture.

The modified technic described, used in this case, was as follows:

At the first surgical session the right maxillary second molar and first and second bicuspids and the left maxillary second and third molars were removed under local novocain anesthesia. The tooth sockets were curetted of the diseased pyorrheal tissues, the buccal and proximal alveolar margins trimmed with Rongeur forceps and smoothed with bone files, and the soft tissues trimmed so that, when approximated, half of the orifices of the tooth sockets were closed. Two sutures were used at the interproximal space between the right bicuspids and at the right first molar edentulous region, which had also been opened up to trim sharp alveolar process.

Prior to the surgery the posterior teeth had been trimmed off the model made from the third impression and a sheet of baseplate adapted to the model with particular emphasis upon the accurate adjustment palatally. Bite-blocks were constructed of pink sealing-wax. The baseplate and the bite-blocks attached were then fitted to the mouth immediately after the removal of the posterior teeth, and adjustments

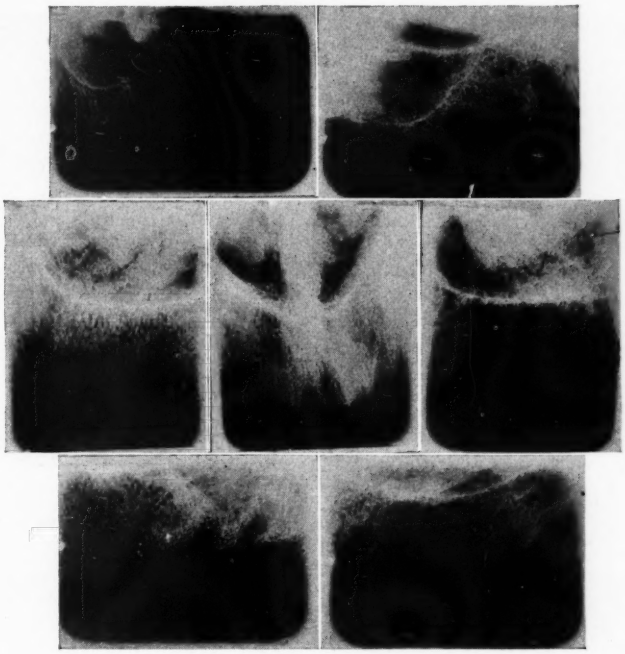


Fig. 12
Radiographs of maxilla after operation.

of bite and tissue adaptation were made.

The next day the patient felt comfortable enough to have the remaining anterior teeth and the left first bicuspid removed. Local novocain anesthesia was again used. Two vertical incisions were made in the cuspid regions extending about one-half the distance between the gum line and the apex of the tooth root. A horizontal incision was made extending from the right cuspid to the left second bicuspid region and the mucoperiosteal tissues separated from the teeth with a periosteal elevator. The removal of the process and excess mucoperiosteal tissues was then carried out in the manner described, the tissues covering the anterior teeth being brought in close proximity to form a neat seam. As the gum above the anteriors was unusually conspicuous in this case, it was necessary to remove more of the labial plate than would ordinarily have been done, to allow for the esthetic replacement of the teeth. Three sutures were inserted, at the median line and at the right and left cuspid regions. Fig. 12 shows radiographs of the surgically prepared mouth.

The extracted teeth meanwhile had been placed in a 50% peroxid solution to clean them and then inserted into

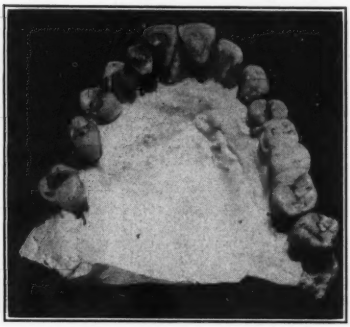


Fig. 13

Palatal view of model, incorporating extracted natural teeth.

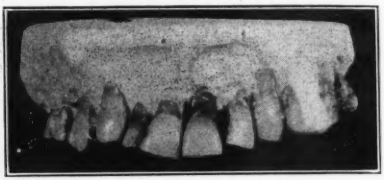


Fig. 14

Front view of model, incorporating extracted natural teeth.

Fig. 15

Side view of model, incorporating extracted natural teeth.

the first impression, which had been taken at a former visit and into which had been previously placed the extracted posteriors. The impression was poured immediately, showing the exact natural tooth arrangement. The model (Figs. 13-15) was ready by the time the surgery was completed and furnished a guide for adding the anterior teeth to the immediate baseplate denture.

The immediate denture with anterior teeth and posterior bite-blocks was tried into the mouth and adjusted (Figs. 7-9, 16). It is interesting to note in Figs. 17-20 how closely the trimmed and scraped study model upon which the immediate denture is constructed and the surgically prepared mouth approximate each other. The front and side views in Figs. 17 and 19 show the articulated prepared upper model, and Figs. 18 and 20 a model made from an impression taken immediately after the removal of the teeth and the surgical ridge preparation. A few drops of camphophenique were placed in the trough of the immediate denture and the denture inserted. The patient was instructed to wear the denture as long as she possibly could, to rinse it before

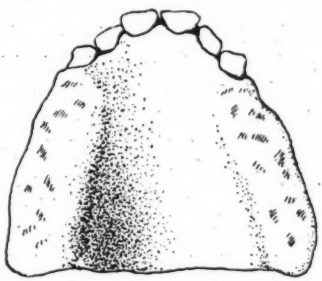


Fig. 16

Completed immediate denture, anterior teeth and posterior bite-blocks.

Fig. 17

Front view of articulated model made from third impression. Teeth cut off and model scraped to prepare immediate denture.

Fig. 19

Side view of articulated model made from third impression. Teeth cut off and model scraped to prepare immediate denture.

Fig. 18

Front view of model made from impression taken immediately after surgery was completed.

Fig. 20

Side view of model made from impression taken immediately after surgery was completed.

retiring with a solution of warm salt water or sodium perborate (one-half teaspoonful to the glass) and to replace it and keep it in the mouth during the night.

The next day the patient reported having worn the immediate denture almost continuously, as instructed, except that she had to remove it during the night because of tissue swelling. It had been replaced early in the morning. She had no untoward symptoms, complaining only of slight dull discomfort. The tissues operated upon were sponged gently and exposed to the Kromayer light. The following day the same treatment was given, the patient having felt quite comfortable during the previous day and night. Just the usual swelling and slight redness were evident in the mouth, as well as a narrow area of sloughing tissue along the junction line of the tissues. The following day being Sunday, the patient was not examined.

On Monday the patient informed

me that she had felt comfortable and had been successful in chewing soft foods. She was very much cheered at her success. This was gratifying, inasmuch as the tissue swelling had subsided and had begun to shrink very markedly, anteriorly, loosening the immediate denture. The tissues at this visit were sufficiently knit together to warrant the removal of the sutures. The mouth was cleaned and the operated tissues given another Kromayer light exposure treatment. At this time the baseplate and teeth for the temporary denture were tried in. The next day a vulcanite denture was inserted. Adjustments were made the following day. Four days later the patient informed me that although the denture was becoming continuously looser in the front region of the mouth, she could nevertheless eat soft foods fairly well and had even appeared at a public function and made an address since her last visit.

When she next visited me, two weeks later, she reported that there had been no pain, and that the anterior tissues particularly were becoming resorbed rapidly, loosening the denture. In spite of the resorption, the denture still held securely enough to permit the patient to carry out her usual public activities and attend a banquet, where she very cautiously but successfully manoeuvred her food without attracting attention. At this time a lining of modeling compound was made along the ridge and the labial and buccal sections of the denture, there being no time for the denture to be vulcanized. She next visited my office a month later, during which time she had become completely accustomed to the presence of the denture, returning to her normal eating habits. At the last visit, when the denture was relined with vulcanite, it was evident that fully 3 to 4 mm. of resorption of the tissues had taken place during the month's absence.

Comments and Conclusions

The case described is one in which the patient had deferred having her teeth removed through fear of going about toothless for a period of time, in spite of the fact that her physicians had advised having it done because of her physical condition. She was informed that the rheumatic pains, pyelitis and heart disturbance were typical focal infection symptoms of possible dental origin, yet she hesitated to have the teeth removed until she was assured of immediate denture replacement.

The modified technic which I have described, that is, preparing the mouth surgically for the reception of the denture in two sessions instead of one, proved satisfactory to both the patient and the operator. It afforded in this case, as in others in which both posterior and anterior teeth must be removed to be replaced by a denture, the advantages of eliminating surgical shock, facilitating more accurate comfortable reproduction of previously existing intermaxillary relationship and eliminating interference with the patient's business and social affairs.

The construction of the immediate denture as described is a simple matter. Although the immediate denture is made of baseplate material and sealing-wax and is a very temporary substitute for the natural teeth, it serves very important functions. In addition to the

advantages previously enumerated, it reduces hemorrhage by aiding the formation and organization of the blood-clot, it appears to stimulate the more rapid deposition of new bone to fill up the sockets, helps to mould the ridge tissues to the desired retentive form and aids the patient in becoming accustomed to the wearing of a denture. In the case illustrated the immediate denture was comfortably retained in the mouth after the second day and used to eat very soft foods after the fourth day, at the same time serving a cosmetic purpose and supporting the facial musculature. The least that we can do for our semi- or completely edentulous patients is to offer them the obvious advantages obtainable from proper surgical mouth preparation and immediate denture service.

665 Fifth Avenue

[GINGIVAL THIRD CAVITIES]

Gingival third cavities again offer a splendid opportunity for the use of amalgam. These cavities should be as shallow as we can make them and for that reason should be undercut for retention. Gold inlays in these positions require deeper cutting for retention and for this reason are less desirable. The appearance of several gingival third cavities simultaneously is a sure sign of severe susceptibility to caries and calls for the maximum of extension for prevention and great care and fine work in order that caries may be kept under control. Gold foil probably makes the most serviceable filling, but it cannot be used so extensively as we might wish on account of the difficulties of access in the back teeth. Again, its cost is prohibitive. But amalgam fillings, well placed and well polished, can be depended on to give splendid service.

—BLACKWELL.

Some Essentials in Full Denture Technic

By F. M. HIGHT, D.D.S., Houston, Texas

(Literary Collaboration by GEORGE WOOD CLAPP, D.D.S.)

Sixth Article

ADJUSTING THE CONDYLE PATHS OF THE ARTICULATOR AND CHECKING THE FINISHED DENTURES

The forward and downward inclinations of the condyle paths of the articulator may be adjusted by means of check-bites into harmony with the same paths in the patient. If these paths in the articulator are in harmony with the paths in the patient, it is probable that teeth set to balancing articulation in the articulator will balance in the mouth. If the paths in the articulator are not in harmony with the paths in the patient, the teeth will not balance in the mouth during lateral and protrusive movements, even if they balance in the articulator.

Check-bites will be of no practical value if the baseplates move while they are being made. In cases where the baseplates are not perfectly adapted, or where there is sufficient soft tissue so that they move during the making of check-bites, it will be very difficult to make a series of check-bites that will give identical readings.

If check-bites are to be accurate and of practical value, they must be taken in the correct position. If they have the practical value that some workers ascribe to them, it should be possible to take any number on the same side in the same mouth, one after another, and get identical readings. Experience shows this to be impossible, because, while an occasional patient will bite laterally without protrusion, most patients, if left to make check-bites without control by the Gothic arch tracing, will include different amounts of the protrusive element in the lateral movement and thus bite in a different place each time, which has a tendency to give a different reading.

While the writer is using check-bites at the present time as a means of adjusting the condyle paths in the articulator, he feels that they are far from satisfactory and looks forward to the time when a more exact and satisfactory technic will be available.

PREVENTING LOSS OF CENTRIC RELATION

Once centric relation has been obtained by means of the Gothic arch tracing, it can be retained, if there are no errors in the subsequent technic which will destroy it. But such errors may occur and be dangerous for two reasons: (1) the dentist may not recognize them or (2) he may not know how to correct them.

One source of such errors may be motion between the parts of the flasks in which the dentures are invested for vulcanization. This motion may result from the carelessness of the manufacturer in fitting the parts of the flask together, from wear of the locking device as the result of use, from the absence of any satisfactory lock between parts or from distortion of the flask by pressure from within. Dentists should see to it that their flasks have a locking device which will hold the parts immovable in correct relation, and that it is in good condition.

Many flasks are ruined by dentists who use a sufficient excess of rubber in packing to cause great pressure from within. Others are ruined by the practice of striking the flask with a hammer to free the denture. A good flask may be ruined while removing a single case in this way.

Errors from movement between the parts of the flask are more likely to occur during the construction of the maxillary denture than during the construction of the mandibular denture. The relation of the cast to the teeth in the mandibular denture is such that the line of any excess pressure within the flask is likely to be in the line of closure of the flask, and a lateral movement of one part of the flask on the other may not be caused. In the maxillary denture the relation of the cast to the teeth is such that any excess pressure within the flask is at an angle with the line of closure of the flask, and lateral movement of one part of the flask on the other may result.

Any change in the relation of the cast and the teeth necessitates a change in centric relation, and the relation established by such a change may not be so comfortable or efficient as that the dentist established with the Gothic arch.

DETECTING AND CORRECTING SUCH ERRORS

The technic which the writer uses provides for detecting and correcting errors in centric relation which may have arisen from the causes which have just been described.

Casts are made of some material which does not soften during vulcanization. Before they are mounted in the articulator, the upper surface of the maxillary cast and the lower surface of the mandibular cast are grooved from right to left and from front to back, as shown in Fig. 15.

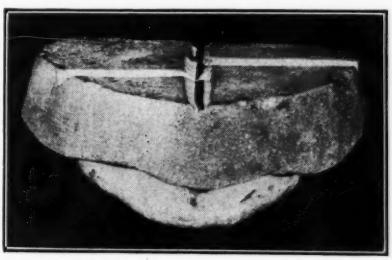


Fig. 15

Maxillary cast showing grooves on surface next to model bow. Grooves similar in principle are cut in the lower surface of the mandibular cast.

The grooved surfaces are moistened with water containing a little soap, and the casts are mounted in the articulator in the usual way. As the soapy water will prevent a strong union between the casts and the plaster used to mount them, sticky wax is flowed over the line of junction.

When the maxillary denture is to be vulcanized, remove the cast, with the denture on it, from the articulator, leaving the plaster by which it was mounted in place upon the model bow. Moisten the surfaces of the cast with water containing a little soap or cover them with tinfoil, so that the cast can be removed intact from the flask, after vulcanizing is finished, by cutting around the cast in the flask.

After vulcanizing, remove the tinfoil if it has been used and remount the cast, with the denture on it, in the original position on the plaster which remains on the model bow of the articulator, by the use of sticky wax.

Errors which have arisen during vulcanizing will be shown by a change in the relation of the maxillary and mandibular teeth. They should be corrected by a rearrangement of the mandibular bicuspids and molars.

The mandibular denture is then flasked, vulcanized and remounted according to the technic used for the maxillary denture. The teeth are then ground to perfect contact in centric relation.

Both dentures are now removed from their casts, trimmed and polished in the usual way. The mandibular cast may be too badly broken during this removal to be of further use, but the maxillary cast should not be so much broken that it will not hold the denture in correct position if subsequent rechecking becomes necessary.

Checking the Finished Dentures

The dentist who is to check the finished dentures intelligently should have in mind a clear-cut picture of what constitutes perfect articulation, in the practical sense of the word, and particularly of what the cusp relations should be in different positions of the mandible to make the dentures easy-running. Gysi has described these relations so perfectly that there should be no need of repetition here, but it may be well for the dentist to refresh his mind occasionally by references to the books entitled *Prosthetic Articulation* and *Professional Denture Service.*

After the dentures are finished, the articulation should be checked in the mouth and made as perfect as possible there before the patient is permitted to wear the dentures out of the office. If the patient is allowed to wear the dentures before the articulation has been balanced in the mouth, they are very likely to irritate the mouth. No other time for balancing the articulation is so acceptable to patients, because, after they have had the dentures even a few days, they do not wish to go without them.

The first step in checking the articulation is to place the maxillary denture in position in the mouth. If the case presents enough soft tissue to permit this denture to have slight movement, the palatal surface may be sprinklered with gum tragacanth or some of the commercial preparations employed to stabilize dentures. Compound is traced onto the occlusal surfaces of the second bicuspids and first molars of both sides of the mandibular denture. This compound is heated with the flame of a mouth blowpipe, and the denture is placed in position in the mouth and held with the forefingers of both hands. The patient is instructed to relax and

then to close the molar teeth together lightly with a chopping motion. Care must be taken to guard against closure in a protruded position.

Both dentures are now removed from the mouth and occluded by means of the compound between them. If the bite as just taken was protruded, the relation of the cusps should show it. The dentures are now to be returned to the articulator. The maxillary denture is mounted on the original cast, which was of stone and is still capable of holding the denture in the correct position.

The mandibular denture is now articulated to the other denture by means of the compound check-bite that has just been taken in centric relation. The mandibular denture is attached to the lower model support with plaster. When this plaster has hardened, the dentures are removed and new check-bites taken.

The initial grinding may be done with stones in the dental engine. The amount of grinding necessary will be governed by the accuracy with which the teeth articulate. One often hears the complaint that teeth change position during the process of vulcanizing, but if the technic set forth in the first part of this article is carefully followed, any errors caused by tooth movement during vulcanization may be corrected.

After the initial grinding with stones in the engine is finished, the dentures are taken to the mouth, and articulating paper is placed between the teeth on both sides. The patient is instructed to rub the teeth together from side to side and forward and backward. The dentures are then replaced on the articulator. If the articulator is moving in harmony with the patient's jaw movements, it should be possible to cause the teeth to come into contact on each of the carbon markings. If these markings cannot be brought into contact, it means that the articulator is not moving as the patient's jaw moves. It is then necessary to place the dentures in the mouth and take new protrusive check-bites.

The dentures are now returned to the articulator, and by means of the check-bites the forward and downward inclination of the condyle path of the articulator, which Gysi calls the *sagittal inclination,* is reset. It should then be possible to secure contact between the carbon markings, just as it occurs in the mouth. If this is so, carborundum, grit No. 90, in glycerin is now liberally applied to the occlusal and incisal surfaces of the mandibular teeth, and the maxillary teeth are brought down into contact. If the latest articulator Gysi has given us is being used, the lateral movement on one side is stopped by keeping the lock nut on that side tight until the other side runs smoothly. Then the opposite side is ground in the same way. Both lock nuts are then released, the incisor guide pin is removed from the articulator, and the teeth are ground to a further freedom of movement. When this has been attained, the dentures are removed from the articulator, and the occlusal surfaces are polished with a rubber disk containing a grit, which may be run either in the engine or on the lathe.

The dentures are now delivered to the patient. After they have been worn four or five days, there should be a

final checking for balance in the mouth and to remove any causes of traumatic occlusion. It is sometimes necessary to place carborundum powder between the teeth in the mouth and have the patient grind them together in order to secure easy-running dentures. The results of this practice are satisfactory only in mouths where the dentures are fairly stable in position, and where patients will make definite lateral and protrusive movements.

Many dentures may be improved after a few months of wear by rechecking the articulation by these methods. Some dentures that have been worn for years may be improved in the same way. So great are the benefits to patients from periodical checking and rebalancing of artificial dentures that the writer has often thought of instituting some system of suggestion to his patients that they return semi-annually for this service.

1323 Medical Arts Building

[TRIGEMINAL NEURALGIA]

That one is occasionally puzzled I admit, but under these circumstances a ready diagnostic measure in the alcoholic injection is always at hand. If an effectual alcoholic injection, that is, one which induces anesthesia at once in the zone supplied by the division injected, does not give absolute and immediate relief of pain in the same distribution, whatsoever form of neuralgia the patient may have and whatever the character and intensity of pain, that patient does not have major trigeminal neuralgia. From this deduction there is no avenue of escape. The term trigeminal neuralgia, or tic douloureux, I find is loosely used at times, especially by those who deal with the sinuses. There is no relation between sinus disease and tic douloureux, and this is another indisputable statement to which there is no exception.

—FRAZIER.

The Color Problem in Dentistry

By E. BRUCE CLARK, D.D.S., Uniontown, Pa.

Final Article

COLOR AND ILLUMINATION

One of the most discouraging moments in the practice of dentistry comes with the completion of a prosthetic restoration which apparently matched satisfactorily when the shade was taken, but which fails completely when the restoration is placed in the mouth. This type of failure can usually be traced to one or both of two factors related to illumination. The first factor has to do with the quality of the illuminating light under which the shade was taken, and the second deals with the control of the illuminating light entering the artificial restoration in an effort to counterbalance the effect of fluorescence which is common to natural teeth. The quality of illuminating light seems of minor importance when compared to the imitation of fluorescence, however. The colorist must know just what to expect of his colors under different sources of illumination and for this reason a rather detailed discussion of the variability in light sources will follow.

It is very difficult to obtain a pure white light source for color work because daylight varies in hue with the time of day and the condition of the sky in an even wider range of variations than is common to artificial sources. These wide variations in hue largely escape our notice because we are subject to the law of adaptation.* Our eyes become adapted so quickly to the existing light conditions that we are seldom conscious of being surrounded with blue or yellow light unless some unusual situation calls it to our attention. The hue difference in two light sources may be demonstrated in a striking manner by the following experiment:

Select a room illuminated by a north window on a clear day. Place a strong artificial light in such a position in relation to the window that two shadows of a pencil or some similar object may be obtained on a white surface, one shadow being illuminated by daylight and the other by the artificial source. Regulate the intensity of the daylight by drawing the shade, if necessary, so that the shadows will be approximately equal in brilliance. The contrast in the color or hue of the lights may then be seen in the shadows, one generally appearing a deep blue, while the other is a brown.

These hue differences in light sources are responsible for the differences seen in reflected colors when compared under

* THE DENTAL DIGEST, November, 1931, page 736.

daylight and artificial light. For this reason the dentist is required to be familiar with them so that he may make allowances for certain light conditions and avoid unfavorable lighting facilities. He should know what to expect from a clear north sky or from a particular artificial source that he is at times required to use. The following brief explanation of the physical differences found in light sources may be helpful.

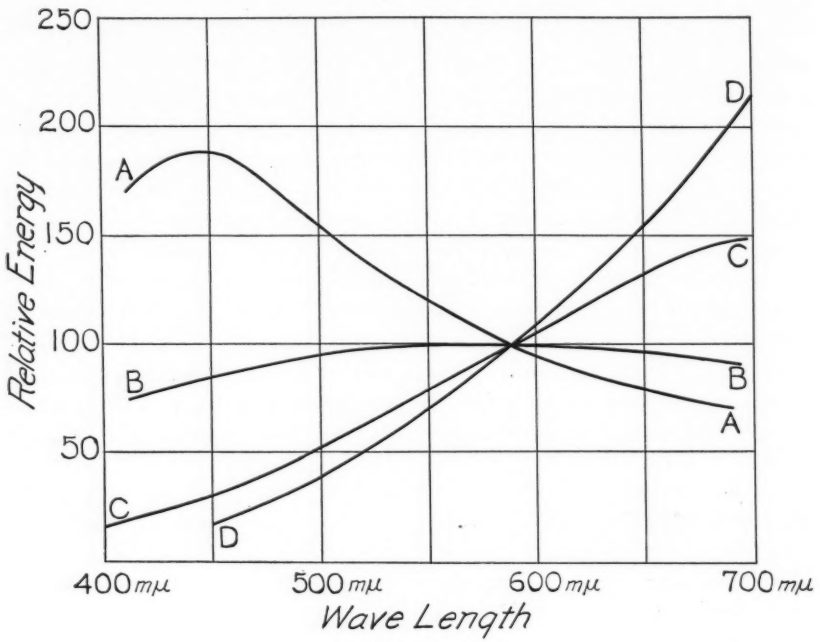


Fig. 13

Energy curves of four sources of illumination plotted against wave-length: *A*, blue sky-light; *B*, noon sunlight; *C*, ordinary electric light; *D*, electric light of low wattage.

From our study of the phenomenon of reflection and absorption we learned that pigments are capable of selecting from light certain wave-lengths which in turn are reflected, thus giving the pigment its characteristic color. A red object reflects the long wave-lengths and a blue object the short rays, provided the illuminating light contains all the wave-lengths of the visible spectrum. A red color will not appear red when illuminated by a green light nor will a blue color appear blue when illuminated by a red light, so it follows that a pigment must be illuminated by a white light in order to disclose its true color, because pure white light contains all the wave-lengths the pigment is capable of reflecting, regardless of what the color may be. White light is

therefore the ideal illuminant, because not only does it contain all of the wave-lengths of the visible spectrum, but it radiates each with a relatively equal amount of energy.

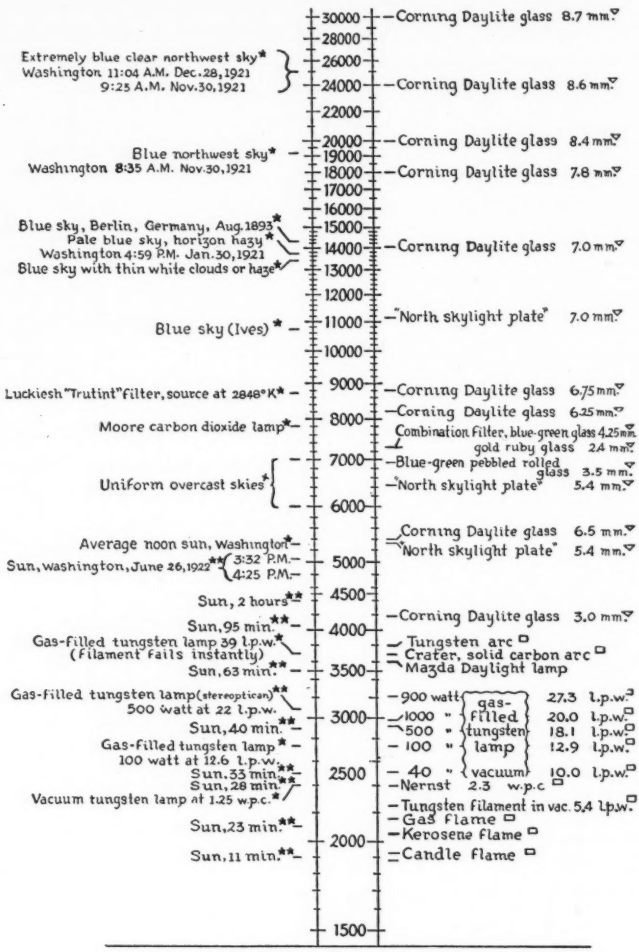
Our best source of white light is the sun at noon on a clear day, but of course we cannot make use of direct sunlight in our color work in dentistry because of its great intensity. We are therefore required to use either sky-light (indirect diffused sunlight) or artificial light, and all these substitutes exhibit hue. They are never pure white light. We may illustrate this fact diagramatically, as in Fig. 13, by plotting the relative energy of various light sources against the wave-lengths of the spectrum. Note that noon sunlight radiates all wave-lengths with a comparatively equal amount of energy (Curve *B*), and that blue sky reflects the shorter wave lengths (blue) with almost twice the relative energy of sunlight (Curve *A*). In the artificial sources (*C* and *D*) we find that one source is totally lacking in certain of the blue rays, and that both reflect the long wave-lengths (red and yellow) with considerably more relative energy than sunlight. These curves demonstrate that blue sky-light has a blue hue, and that artificial light has a yellow hue; also, that red, orange and yellow colors will appear more brilliant in artificial light than in daylight, because the longer wave-lengths are radiated with considerably more relative energy from an artificial source than from daylight, the reverse being true of blue and green.

COLOR TEMPERATURE GRADING

Some years ago the Bureau of Standards developed a method of specifying the quality of various light sources without the necessity of making spectral energy measurements. This method grades light sources on the basis of color temperature. "The color temperature of a source is defined as the temperature of a black body which has the same spectral distribution through the visible spectrum as the source in question."* When a piece of iron is heated, it radiates a dull red color. If the temperature is increased, the color becomes yellow, which is usually spoken of as *white heat*. Now, if it were possible to continue the heating process without melting the metal, its color would actually change to white and then to blue with the increase in temperature. A black body theoretically heated to produce these various temperature colors will exhibit the color qualities of all artificial illuminants and daylight. The method therefore provides the basis for a very simple and comprehensible classification of illuminating sources. Artificial daylight lamps can now be calibrated in terms of color temperature, which is written °*K*. This allows the purchaser to specify the exact color quality he desires for the particular work that requires artificial illumination. The so-called *daylight* lamps that are not calibrated in terms of color temperature seldom have sufficient daylight qualities, and their purchase should be avoided.

A very interesting and instructive comparison between artificial light sources and daylight may be seen in

* Cady and Dates: *Illuminating Engineering*, page 96.



DAYLIGHT AND ARTIFICIAL LIGHT ON COLOR TEMPERATURE SCALE

** Direct sunlight, time after sunrise and before sunset.
Data marked * and **, by Priest; □ by Cady and Dates.
▽, with light source at 2848 °K

Fig. 14*

Color temperature scale of daylight and sunlight from 1900 °K to 24,000 °K and of artificial light sources below 4000 °K and as modified by filter glasses to 30,000 °K with a light source at 2848 °K.

(* From *Color Temperature Classification of Natural and Artificial Illuminants,* by Norman Macbeth; TRANSACTIONS OF ILLUMINATING ENGINEERING SOCIETY, 1927.)

the table in Fig. 14. Note that candle-light, which is very yellow, is only 1900 °K, and that sunlight is of the same temperature at 11 minutes after sunrise and before sunset. Following up the scale it will be noted that our regular 100-watt gas-filled tungsten lamps produce a very yellow light, because they correspond to sunlight at only 35 minutes before sunset and after sunrise and are only 3100 °K. A pure white light must be at least 5100 °K, which corresponds to noon sunlight. Note how the Mazda daylight lamp falls short of being white light. The daylight glasses listed in this table are light filters placed over a light source of 2848 °K. These can be secured in daylight lamps up to 30,000 °K.

From this table we get a complete picture of the tremendous quality differences found in the various light sources we are required to use. We should be familiar with these quality differences, for we know that almost every color is subject to some degree of change in its appearance when viewed under a light of low color temperature and then under one of high color temperature. If all colors changed with the same degree under different light sources, the quality of light would not be such an important factor in color-matching, but since two colors may match perfectly under one source of illumination and then appear quite different under another source, the subject of color-matching becomes more complicated in respect to illumination. When two colors appear identical under artificial light but do not match in daylight, these colors are different in spectral reflectance; that is, there is a physical difference in the light which each reflects. Under artificial light these colors are alike, so far as the eye can see, but if their energy curves were to be plotted against wave-length, as in Fig. 13, the curves would not coincide.

These physical differences found in apparently identical colors may be further explained by the use of dental porcelain or cement for an example. Let us select a color of porcelain and match it perfectly under white light with porcelain prepared by a different manufacturer. And let us assume that these same two colors do not match under blue sky-light, as would be found if the experiment were actually carried out. Now, this change may be due to the fact that the colors have been produced from pigments of an entirely different chemical composition or from the fact that one color contains only one pigment while the other has been made up from a combination of pigments, which is usually the case. The physical nature of the materials also will influence the manner in which each reflects its color. With all these physical and chemical differences existing in porcelain and cement products, it is quite evident that variations will be found in their selectivity for different wave-lengths of light in respect to reflection. Two colors will match under all sources of illumination only when their spectral characteristics are identical, which is determined by comparing their spectral reflectance curves in a manner previously described.

It is possible that manufacturers of porcelain and cement products attempt to reproduce the spectral characteristics of the natural teeth, but if they do, the fact is not advertised nor are the data furnished. The dentist must

necessarily gain from experience alone his information concerning the various materials which he uses, and no two dentists use the same materials throughout, so what might be said of one operator's experience could not be applied to another. Therefore in a discussion of this subject we are required to study the behavior of color in general, under various light sources, instead of being able to restrict our investigation to any specialized group of materials.

Fortunately the hue of tooth color is yellow, because yellow, of all spectrum hues, is least influenced by changes in the quality of illuminating lights. All sources of light contain yellow rays, and this energy is reflected by yellow objects in comparatively equal amounts under different sources. If the spectral energy of yellow (580 mu) is taken as 100 for each of three sources of light, blue sky, noon sun and tungsten lamp (Fig. 13), red would be reflected in the following proportional amounts: 70 under blue sky, 90 under noon sun, 200 under tungsten lamp; while blue would be reflected as follows: 180 under blue sky, 85 under noon sun, 15 under tungsten lamp. This difference in spectral energy for red, yellow and blue accounts for the fact that certain blues can scarcely be distinguished from black under artificial light, but when seen under blue sky they become more brilliant and saturated. Many colors appear purple (reddish-blue) under artificial light and blue under daylight because red rays are reflected under artificial light with so much more relative energy than the blue rays, since the proportion is 200 to 15. This same color appears blue under blue sky because the proportion of energy is reversed, 70 to 180. The hue and brilliance of reds change under different sources of illumination for the same reasons, while yellows remain fairly constant.

If all three areas of a tooth were of the same saturation of yellow, we should have less trouble with our color-matching in respect to varying illuminating conditions, but since the incisal areas often approach neutral gray, we are bound to meet difficulty. Neutral colors reflect all wave-lengths of white light, that is, all colors of the spectrum, with a comparatively equal amount of energy. Now, when a neutral gray is seen under artificial light, it will appear to be yellowish or reddish gray, because artificial light contains an overabundance of yellow rays. When the same gray is seen under blue sky, it may appear bluish gray, because blue rays are dominant in blue sky-light. Most all the gray colors we use in dentistry are subject to this change of quality but of course with varying degrees, depending upon the spectral characteristics of the material itself. The difference that exists between the spectral nature of tooth structure and the materials we use can be determined only by a close observation of their behavior under different illuminating conditions. The only suggestion the writer can make to those who have not made a study of their favorite materials is to avoid blue sky-light when taking the shade, as well as yellow light or light of low color temperature. The following paragraphs will present the reasons for this suggestion, together with a discussion of the particular light quality best adapted for general color work in dentistry.

CHOICE OF ILLUMINATING LIGHT

Many writers on this subject recommend north sky-light for dental color work. This recommendation is probably made in view of the fact that north light is usually an intense light of a diffused character and is at all times of day and season free from the direct rays of the sun. These factors are all advantageous, but, on the other hand, it is possible for north sky-light to vary in quality through a range of 24,000 °K. If we were to disregard this fact relative to the quality of north sky-light and select a light only for properties of diffusion and intensity, east sky-light would be our next choice. East light is usually free from direct sunlight after 10 A. M., and it furnishes a well diffused and intense light throughout the remaining hours of the day. West and south sky-light is suitable for color work only under certain conditions and for a limited time each day, depending on the cloudiness of the sky and the season of the year. An overcast southern sky can be used because the clouds diffuse and reduce the intensity of direct sunlight which is common to that exposure, but on a clear day it is very unsatisfactory.

Regardless of whether our operating light may come from a north, east, south or west exposure, the properties of diffusion and intensity are not the most important factors to be considered in the choice of a light for color work. They are of course essential. However, the factors that should be most seriously considered are those that influence the quality or color temperature of the light in use. In daylight the condition of the sky is the governing factor. For example, a north blue sky will give a very blue light on a clear day, but when clouds are present, the color temperature is reduced and the blue is diluted with white. When the sky is completely overcast, the light may be very white. The same conditions may exist in an eastern sky in the afternoon with further variations from an overcast sky in the late afternoon, for the clouds then may reflect a yellow light.

Blue sky-light and ordinary artificial light are the extreme sources of illumination in respect to the quality of light and should be avoided when we are not familiar with the behavior of the particular material in use under all sources. When blue sky-light has been used for taking a shade, it is preferable to check the color match under a yellow light, for we must not lose sight of the fact that our patients are seldom exposed to blue light in their social contacts. Many fastidious women avoid blue sky-light, for they well know its effect on color harmonies and especially on that "school-girl complexion."

It is a very good plan to postpone the taking of the shade for very particular cases until it can be secured under an overcast sky near the middle of the day. When the sky is uniformly overcast, the light received by a window of any exposure is a very white light ranging from 5000 °K to 7000 °K. Light within this range of color temperature can be considered of average quality; that is, it is neither too blue nor too yellow, and when a color is matched under it, the color will prove to be a much better match under artificial light than could possibly be

expected had the original match been made under blue sky.

There is one disadvantage in the use of an overcast sky: it is not of sufficient intensity when the glass opening of the window is small or when another building limits the area of exposure to the sky. This limited light condition exists in most of the offices located on lower floors of city office buildings. Furthermore, when daylight is of sufficient intensity for use in this type of office, it is usually so altered in quality by reflection from outside sources that it is not suitable for color work. The writer has overcome this annoyance of dark days and outside influences in his own office by the use of two daylight lamps, provided with filters calibrated to produce a light temperature of 5800 °K. Filters producing this quality of light may be used over gas-filled tungsten lamps of only 200 watts, provided they are used at close range. If daylight lamps are used in a dark room, the room should be provided with neutral walls, preferably black. If the dark room is further equipped with two artificial sources of approximately 2500 °K and still another pair of lamps furnishing the equivalent to blue sky-light of 20,000 °K, it provides a very excellent laboratory for the study of color changes peculiar to various materials under different sources of illumination. The intensity of the three pairs of lamps may be regulated and balanced by the use of a rheostat.

Fluorescence

Regardless of how perfectly we may be able to select or construct an artificial tooth in respect to color, there still remains that lifelike quality in a natural tooth which it is very difficult to reproduce. A porcelain tooth of identical color specifications often seems "dead" in comparison to the natural tooth. This of course is not always apparent, but it is so common that every dentist has recognized it many times. This lifelike quality of a natural tooth is believed by the writer to be due to fluorescence.* The theory is not based entirely upon the established fact that natural teeth are highly fluorescent when exposed to ultra-violet radiation but rather upon a large group of factors, all of which apparently support the supposition that natural teeth actually fluoresce under ordinary sources of illumination as well. Whether or not research may definitely establish or disprove this theory, it provides and will remain a very satisfactory basis for further research in our efforts to establish this same lifelike appearance in artificial teeth. Research in this subject is not confined to certain individuals or groups but can be carried on by every dentist who constructs prosthetic restorations, provided he understands the nature of the color qualities he is attempting to reproduce.

An object is said to be fluorescent when it has the ability to generate light (radiant energy) within itself. This additional production of light is the result of a molecular activity which is stimulated into action by an outside source of illumination. We assume that natural teeth fluoresce and we know that porcelain teeth do not, even under ultra-violet radiation. Now let us construct an imaginary anterior

* The Dental Digest, October, 1931.

fixed bridge, using various types of facings, as a medium for the illustration of this phenomenon. A central incisor is missing, which makes it necessary to use the remaining central incisor for one of the abutment teeth. The customary procedure is first to select a facing of correct color requirements, and in this particular case we are fortunate in finding a facing that matches almost perfectly. We visualize the finished result and find it exceptionally pleasing, so we proceed with the construction of the bridge with enthusiasm and technical care. A three-quarter crown is made for the central incisor. A porcelain saddle or tip is added to the facing, the margins of which are beveled, a backing cast completing the pontic. The facing is then cemented to the backing and the bridge cemented to its abutments in the mouth. We remove the excess cement and find that the facing is now very much off shade; it is too dark and lifeless.

The natural central accommodating the three-quarter crown is found to have changed very little in color composition; it still has its lifelike qualities radiating out of the body of the tooth. There is a slight change in the incisal edge, depending on the thickness of the tooth and the type of preparation used in that area. The incisal and distal margins are slightly dulled, due to the presence of the three-quarter crown margins, which interfere with the multiple reflections that pass mesially and distally from one tooth to another. Regardless of these slight influences, the color of the natural tooth is much less altered than that of the facing. Why? Because the property of fluorescence still remains active within the body of the natural tooth.

Now let us see what has happened to the pontic to have so changed its appearance, for when we first made the selection it seemed lively and of correct color composition, but now it appears dark and dull. When making the selection, we perhaps neglected to press the ridge-lap of the facing firmly against the gum tissue or to grind the ridge-lap so that it could be pressed firmly against the gums. When porcelain is in contact with the tissues, they act as an absorbing medium in a very peculiar manner, a fact which we shall take time to explain here before going further with the discussion of the various factors that have changed the color of the pontic.

If a tumbler full of water and having smooth sides is held in the hand, on looking down obliquely into it we see the sides as polished, mirrorlike surfaces through which the fingers holding it cannot be seen if the outside surface is dry. If the fingers are moist, they will be seen only in spots where they come in contact with the glass. Light is totally reflected by the sides of the glass at all points except those where the moist fingers press against the surface; at these points the fingers absorb the light. The same phenomenon is often made use of in turning a beam of light through an angle of 90° by the use of a right-angled prism the sides of which are polished (Fig. 15). Light enters from *A* and is totally reflected by the surface *CD*, so that it passes out of the prism in the direction of *B*. Now, if the surface *CD* were moistened and the finger placed against it, the beam of light *A* would be

absorbed by the finger and would not pass out in the direction *B*. This same type of reflection takes place in the gingival-third area of a facing, which is illustrated in the same drawing. Light entering the facing is reflected from the surface of the ridge-lap down into the body of the facing until the

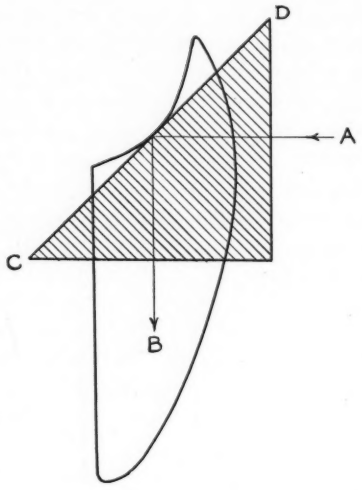


Fig. 15
Example of total reflection within a glass prism and an artificial tooth.

facing comes in contact with gum tissue, which absorbs all the light incident at those points, thus robbing it of a certain amount of energy that helps to imitate the fluorescence of natural teeth.

When we add a porcelain tip to a facing, we increase the area in contact with the gums and further increase absorption. We often use a much darker color for the tip, thus adding another factor to the list of agents that absorb light from the gingival-third area. The beveled edges allow the backing to interfere with the entrance and escape of light from the mesial, distal and incisal directions, thus contributing to the dullness of the remaining areas of the facing. The backing itself prevents any possible entrance of light from the lingual direction. The total amount of light entering the facing has been reduced by all these factors, therefore the total amount of light reflected by the facing must have been reduced and we have a restoration that appears dull and "dead," while the natural tooth is still able to create light within itself, accounting for its unchanged appearance.

It is quite impossible within the scope of this article to discuss the many types of restorations that we are required to make, but in order to illustrate the necessary steps that must be taken to compensate for the fluorescence of natural teeth we shall continue with the fixed bridge and outline the procedure that might have been followed with the same facing in order to prevent the objectionable color change in the finished result.

Instead of building a large porcelain tip or saddle to the facing we shall add only sufficient porcelain to make a desirable contact with the gum tissue, and this contact is to be confined to as small an area as possible. The additional porcelain will be of a more brilliant and saturated color at such points as will not be exposed to view, which will compensate in part for the absorption that must necessarily take place when the porcelain comes in contact

with gum tissue. Now, the bevel will be confined to the incisal edge and will be made as small as the bite will permit so that the facing will receive all the light that is possible from the mesial and distal directions. The facing is then backed with pure gold, which has been polished to its highest degree of luster. Before the backing is swedged to the facing, a strip of platinum foil should be placed between the incisal third of the facing and the gold backing. The bridge is now completed and, after being cemented to place, the facing is found to match the natural tooth as well as it did originally and to have an additional lifelike appearance. The liveliness of the facing is due to the pure gold backing, which acts as a direct reflector just the same as a mirror is a direct reflector, except that it reflects light of a characteristic reddish-yellow hue which is almost identical with the gingival-third hue of natural and artificial teeth. Any light that reaches the gold backing is reflected back through the body of the tooth in a direct reflection, which increases the amount of light radiating from the central portion of the facing. In other words, it lights up the interior of the facing to a much greater extent than can be hoped for from a cemented backing, which must necessarily diffuse the light before it is returned. The gold will reflect approximately 85% of the incident light, while the amount reflected from the cement will vary from 40% to 60%, with the loss of an additional percentage in diffusion. The platinum beneath the incisal third will prevent the undesirable effect of a yellow reflection from the gold in this area and will permit the facing to retain its characteristic color at the incisal edge.

The comparison of the final results obtained from the use of these two methods in the construction of a pontic from the same facing has not been made for the purpose of recommending or condemning any one method. It has been made solely for the purpose of illustrating the property of fluorescence and how it may be imitated in an artificial restoration. In the construction of any type of porcelain restoration we should remember to take full advantage of every available factor which might provide increased illumination within the body of our restoration, in order to imitate the effects of fluorescence in the natural teeth.

The theory of fluorescence is one example of the many avenues open to the dentist for investigation in the subject of color. The purpose of this series of articles was not to discuss these problems of color research but rather to give the dentist a somewhat clearer conception of the fundamentals of color science. Some one has said, "Success in doing anything is always the result of discovering *why* rather than *how*." In these articles we have studied the physical nature of color to learn why colors exist and how they are produced. We have studied the physiology of color vision to learn why errors are so often encountered in color analysis, and we have learned how to avoid them. We have studied also the psychology of color to learn why color is a three-dimensional sensation, and from this most important phase of the subject we have learned how to recog-

nize and differentiate color differences. When we have learned the many "why's" of color science, it will not be so difficult to learn how to apply our knowledge to the reproduction of tooth colors in pigmented materials.

Dentistry Today

By ARTHUR G. SMITH, D.M.D., Peoria, Ill.

VII

"Good Dentistry." "Good Dental Service." What do these terms mean? What do they stand for today in the keen and penetrating light of Modern Scientific Thought and Analysis? Obviously, not at all what they stood for some ten or twenty or forty years ago! It is also equally obvious that the next Decade or Quarter-Century will write far different definitions for these terms from the ones now considered satisfactory. All that any man can do is to interpret the Truth of his own Day honestly and adequately and discharge the Duties devolving upon him faithfully in the light of his understanding of such present-day Truth.

Surely, "times have changed"! Forty years ago the entire responsibility of the Dentist to a problem of Dental Caries was met when the cavity had been carefully excavated to walls of sound enamel and dentin, given a mechanically retentive form and solidly filled with an incorruptible plug which would exclude moisture. Today we know that it is entirely possible to perform operations which meet every one of these demands fully, but which none the less fail miserably to measure up to the present-day standards of Good Dental Service. What has happened? Have the basic requirements of the problem changed? Not at all! *Simply those requirements which always existed in the problem have become more clearly defined and better understood.* Also, mechanical ingenuity and invention, together with the increase in research and application of discovered Truths in the fields of Chemistry and Bacteriology, have vastly augmented our defensive weapons.

In what do these changes referred to briefly consist? It is of course impossible even to list them all in the space here allotted, but perhaps the outstanding forward stride which has eclipsed all others is the perfecting of Operative Technic to a point which permits the adequate handling of practically all problems of Tooth Restoration in fractions of an hour rather than in multiples of that same unit of Time measurement. Sittings of two to three hours for the restoration of a single tooth were matters of almost weekly occurrence in the "Gay Nineties" of gold foil, rubber dam and condensing mallet! All honor to the operators who performed and the Patients who endured through those Heroic Days of our progress toward better things! At the present time 30 to 45 minutes should be enough to cover almost any operative step required in the salvaging

of any tooth, and certainly a similar length of time should suffice for the taking of any impression or bite in Prosthetic work.

The preparation of a vital and highly sensitive tooth for a Porcelain Jacket Crown is probably the most tedious and exacting step in modern practice; yet, by introducing the local anesthetic as soon as the Patient takes the chair, making first only those superficial cuts in the enamel which would be entirely without pain in any event and then proceeding carefully into the dentin as the effect of the obtundent deepens, the entire matter of the preparation of the stump and the taking of the required impressions, etc., can usually be concluded in less than an hour. For all extensive destruction of any of the six anterior teeth in either jaw the baked Porcelain Jacket Crown is by far the best answer available today.

For ALL approximal decay in ALL bicuspids and molars the cast Gold Inlay made with wide buccal and lingual "extension for prevention" and a stout and sharply defined occlusal step is the almost perfect answer to the problem of arresting decay of these surfaces for a Lifetime of service, with a single operation. IN PASSING IT MUST BE STATED THAT IT IS THE PASSIONATELY HELD CONVICTION OF THE AUTHOR THAT *ONLY* THE CAST GOLD INLAY SHOULD *EVER* BE PLACED IN ANY APPROXIMAL CAVITY IN ANY BICUSPID OR MOLAR. Stated in the fewest possible words, the reasons for this conviction are as follows:

It takes so much less TIME to make a *really good Gold Inlay* than to make a *really Good Amalgam Filling that the item of time saved* will far more than meet the cost of the gold used! Seventy-five to ninety cents is an ample allowance for the *average* cost of gold in a single inlay; therefore, if the average Operator considers his time at only six dollars an hour and saves only ten minutes of it by using gold instead of amalgam for his restorations in this class of work, he has more than paid for the gold used by the time saved. In my own practice, which includes a large percentage of both men and women from the lower brackets of wage-earners, NO Restorations in this class of cavities have been made with anything except Gold Inlays in slightly over twenty years. TRY THIS! IT PAYS!

Amalgam has a very definite field in the small and simple fissures throughout the mouth and frequently has no equal when used to arrest the ravages of decay at the gingival borders of teeth which are not conspicuous during speech or laughter. The so-called *Synthetic* Porcelains are really excellent materials if properly mixed and handled, and if their use is strictly confined to their rather narrow and legitimate field, which is of course those anterior approximal cavities which do not involve nor weaken the incisal angle and such gingival restorations as occur in conspicuous locations.

The "Footage" allotted to this Series has been suddenly cut short. The Various types of the Gold Crown, the forms of Castings suitable for Bridge abutments, Etc., Etc., must for the present at least remain in my Auto Point and your own imagination!

These Monthly Excursions into the almost Limitless Realm of "Dentistry Today" have interested at least one person very much—namely, the General Practitioner of some forty odd years of experience at the chair who has tried, in them, to boil down much of that experience to digestible, nourishing and possibly palatable form.

Occasional letters of appreciation and understanding dropping in from all parts of these more or less United States have been straws showing unmistakably that the matters which have been here considered have been of wide interest and have carried a very genuine and general appeal.

534 Jefferson Building

[SILICATES]

Synthetic fillings may be replaced without the loss of much additional tooth structure, and when the patient has been informed that the silicate cement is in most cases not a permanent filling but has some advantages, the first one being esthetics, the patient may be satisfied with the use of this filling for a period of from three to five years, when a new one can be reinserted. In fact, there is nothing in this world that is permanent. The styles change and the people willingly pay the price. It should not be different in dentistry, but it remains to be a case of education. If the dental profession would at all times inform their patients of the truth regarding each operation and prepare them for future work that is necessary in order that they may keep their mouths in a healthful condition, the financial problem of the dentist and his relation to the patient would be largely solved.

—RINEHART.

An Outline of Dental Pathology

By NATHANIEL FREEMAN, D.D.S., New York, N. Y.
Adjunct Dentist, Mount Sinai Hospital and Montefiore Hospital

VIII

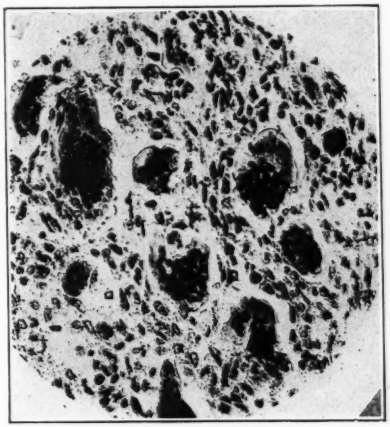
MALIGNANT TUMORS

Sarcoma.

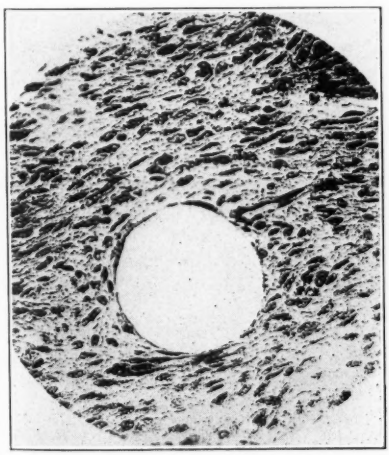
A malignant tumor which closely resembles the developing connective tissue of the embryo or the granulation tissue of inflammation. Microscopically there are several types. The cells vary greatly in size and shape. They may be flat, fusiform, round or branched or even cuboidal or cylindrical.

Occurrence.

They develop from cells of connective tissue in any part of the body. In the mouth they develop from the bone or periosteum, usually in patients with a history of some recent trauma, as following the extraction of a tooth.



Giant-cell sarcoma.



Small spindle-cell sarcoma.

Sarcomata grow rapidly, metastasize and generally produce enlargement of the lymph glands. Blood-vessels are often nothing but open fissures between the cells, therefore hemorrhage is common. This often causes a profound anemia.

Varieties.

(1) *Round-cell.*
  (*a*) *Small round-cell.*
  (*b*) *Large round-cell.*

(2) *Spindle-cell.*

(3) *Myeloid or giant-cell.*
(4) *Osteosarcoma.*
(5) *Angiosarcoma.*
(6) *Melanosarcoma.*

Very malignant. Granules of pigment are found in patches or streaks. These often commence in pigmented moles.

Epithelioma of skin.

Melanotic sarcoma.

Carcinoma.

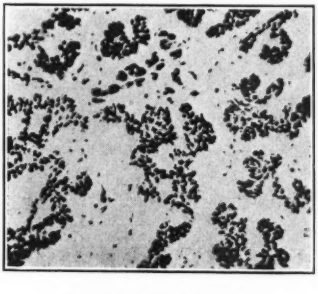
Commonly called *cancer*. A very malignant tumor composed of cells derived from epithelium. They grow rapidly as a rule, have no capsule, ulcerate if external, with indurated and elevated edges.

Varieties.

(1) *Squamous-cell carcinoma or epithelioma.*

(*a*) *Prickle-cell epithelioma.*

Arises from x-ray burns, scars, ulcers, etc. Most common on mucous membranes, lip and skin. They form metastatic growths. The growth starts as a papillary variety which ulcerates rapidly. The lymph glands are generally involved. The cancerous ulcer has an indurated base, the edges are raised and everted, and it is quite painful.



Basal-cell epithelioma.

Microscopically the alveoli are large and form characteristic whorl-like structures looking like the cross-section of an onion, called *pearls*.

(*b*) *Basal-cell epithelioma.* Arises on the face, especially from the eyelids and naso-facial grooves. Rarely occurs on the lips. Sometimes called *skin cancer*.

CYSTS

A cyst is a pathological formation consisting of a more or less well-defined wall enclosing a liquid or semi-liquid material. Cysts, as they grow, produce swellings in the areas where they are formed.

Types.

Retention cysts.

Due to obstruction in an excretory duct of a gland, the secretion accumulates and causes distention. The usual causes of such obstructions are inspissated gland material, concretions, etc. Examples are *sebaceous* cysts of the skin (wens), *mucous* cysts of the lip, *ranula,* cyst of the submaxillary gland. Soft, and usually contain clear fluid. May cause disturbances of function, depending upon location.

Bone cysts (*osteitis cystica*).

In this disease a more or less extensive cavity is hollowed in a bone and is full of a clear liquid. It is limited by its bony wall. Very frequently a history of traumatism. The rarefaction arises about equally through osteolysis and osteoclasis. The presence of connective tissue cells filled with yellow pigment is histological proof of the presence of interstitial hemorrhage and favors the argument of traumatic origin. Very often bone cysts are erroneously diagnosed as sarcoma.

Mucous cyst.

Dental cysts.

Most common types of cysts found in the oral cavity are the *radicular* and *follicular* or *dentigerous* cysts.

(1) *Follicular cysts* are derived from the dental follicle of the permanent tooth germ. Often found about malposed or impacted or supernumerary teeth. These cysts are probably new growths with a central semi-solid or liquid disin-

tegration, which in most cases is absolutely sterile. Their growth is very slow and gentle, permitting the surrounding tissues to adapt themselves to the new conditions. They destroy only through pressure, and their destruction seems to be limited to spongy bone. Within this follicular cyst is usually seen some portion of a tooth.

(2) *Radicular cyst* or *cystic pericementoma* is derived from the so-called *granuloma*. Invariably associated with devitalized or pulpless infected teeth. These pericementomas at some stage of their development frequently undergo central necrosis, which may be due to deficient nutrition or to the virulence of the microorganisms present or their toxins. A cavity is thus formed containing serous fluid, pus, etc. These cysts are characterized by an epithelial lining.

This type of cyst is called also *epitheliated dental granuloma* in contradistinction to the simple non-epitheliated types. These epithelial cells originate in the embryonal rests or remnants of the primary enamel organ. In the great majority of cases these epithelial structures are normally present in the peridental membrane.

To understand the origin of these groups of cells, it is necessary to refer to the development of the enamel and enamel organ. The enamel organ is developed by epithelium, the remainder of which covers the enamel during the developmental process up to the time that the full anatomical crown is erupted. In a tooth germ in which the formation of dentin and enamel has begun, we see at the apical end of the tooth germ the outer enamel epithelium passing over into the inner layer and there forming a loop. This loop is called *Hertwig's sheath.*

The epithelium of the enamel does not end where the enamel ends, but enamel epithelium is found also during development of the root dentin at its apical region, up to the time that the apex is fully developed. A continuous epithelial sheath exists only at the beginning of root formation. As development progresses and the root elongates, the connection between Hertwig's epithelial sheath and the enamel is severed. The enamel organ ends with the enamel, and Hertwig's epithelial sheath remains as a loop on the end of the root separated from the enamel epithelium. The epithelial rests remain between the enamel organ and Hertwig's epithelial sheath, indicating the former continuous connection. As soon as the dentin is fully developed,

the function of the epithelial sheath is completed and it disappears, leaving only epithelial rests to indicate its former existence. In growing teeth the epithelial rests are found in the inner layer of the peridental membrane.

So long as there is no irritation, the epithelial rests remain quiescent indefinitely. If, however, an infection occurs, there is then a reaction on the part of all the cells. As the chief property of squamous epithelium is to act as a protective covering, the isolated cell rests undergo proliferation and there arise dividing and branching chains of epithelium, which grow like a network through the lesion. The cells of the proliferating epithelium differ in appearance from the cells of the epithelial rests; they become large and the cytoplasm and the nuclei become more distinct.

When necrosis occurs in epitheliated granulomas, the epithelial strands have a tendency to grow between live and necrosed tissues, sometimes giving the appearance of an endeavor to encapsulate the tissue that has been destroyed. Such epithelial linings, which may actually cover the entire inner surface of the lumen of a granuloma, must be regarded as the beginning of a *periodontal* or *radicular* cyst.

The exudates accumulating in the lumen cause extension of the cyst, which may grow to the large size with which we are clinically familiar. Careful study of the history and pathology of this type of cyst shows that it is infectious in origin. X-rays also show that such cysts are almost always connected with devitalized teeth. As the lining of these cysts is a squamous epithelium, they sometimes have been regarded as dermoid in nature. Occasionally the lining is partly or wholly of columnar cells, which indicate their paradental origin.

PERICEMENTITIS AND ALVEOLAR ABSCESS

Pericementitis or periodontitis is an inflammation of the peridental membrane and is classified as *acute* or *chronic*.

Etiology.

Mechanical trauma.

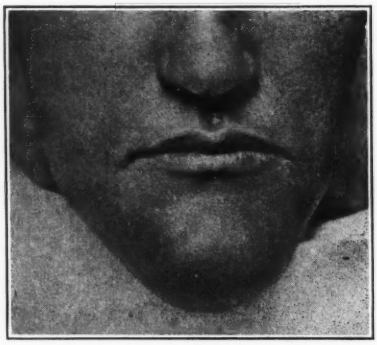
A blow or other external violence, traumatic occlusion caused by improper dental restorations, biting upon hard objects as nuts, etc., too violent wedging of the teeth, excessive laceration of apical tissue by means of barbed instruments.

Chemical agents.

Caustic drugs, like arsenic, formalin, phenol, etc., used in root therapy. Result of drugs taken internally, as mercury, bismuth, etc., in treatment of syphilis.

Bacterial agents.

The largest etiological factor. Usually follows as an extension of the infection from a pulpitis or from an infectious process from the gingival space. The infecting organisms may also be deposited at the apex from the blood current.



Infection of tissues of chin following alveolar abscess of mandibular incisors.

Pathology.

There are manifested in the peridental membrane all the stages of infective inflammation as evidenced by hyperemia, stasis, diapedesis, etc. The tooth is pushed from its socket to accommodate the swollen tissue. The apical tissues break down with the formation of pus, some of which enters the root canal. The pus continues to form until the bone is perforated at some point. In some instances the tissues of the lips, cheek and neck may be swollen.

Chronic pericementitis.

Usually follows an acute process and is due to septic influences, which cause pus to be continually formed at the expense of the apical pericementum and adjoining tissue.

Diseases of the Bone

Periostitis.

Inflammation of the periosteum. The process is essentially similar to inflammation in other parts of the body, except as modified by the structure of the tissue.

Osteitis.

Inflammation of bone, the most common alteration being the absorption of the hard basement substance of the bone and its replacement by or conversion into young cellular forms of fibrillar connective tissue.

In compact bone, enlargement of the Haversian canals is the dominant sign of bone absorption and is always accompanied by circulatory increase. Often the newly formed spaces or marrow cavities may be encroached upon by the newly formed bone lamellae on their walls so that the bone becomes more compact. Both conditions may be found variously associated. If the bone is more porous, the condition is termed *rarefying osteitis* or *osteoporosis;* if more condensed, *condensing osteitis* or *osteosclerosis.*

Osteomyelitis.

Inflammation of the bone and medulla. The soft tissue between the trabeculae or of the medullary canal of the bone is involved. The medulla becomes streaked or mottled. Abscesses may form in the marrow, the periosteum becomes edematous and infiltrated with pus, and the surrounding soft tissue

becomes inflamed. Abscesses of the periosteum or surrounding tissue are apt to form.

As a result, necrosis of the bone may follow, with formation of *sequestra.* The process of separating dead bone from the living is called *sequestration.*

5 East 57th Street

Interesting Dental Curios From Copenhagen

The accompanying photographs were sent to us by Poul Steffensen's Dental Depot of Copenhagen. While the dates are not definitely known, we quote the following from a letter received from Mr. Steffensen:

"The small instrument case (Fig. 1) must be from about 1870-1875, as an Ash catalogue of the latter year shows exactly the same socket-holders for instruments and drills. The adjustable mirror is illustrated in the same catalogue. The tape carriers and separating saws (Fig. 2) are from the same period.

"The various drilling-instrument handles (Fig. 3) and extracting instruments (Fig. 4), I suppose, are from the middle of the last century.

"The larger instrument case with the mother-of-pearl-handled instruments (Fig. 5) is undoubtedly the older of the two, but unfortunately I can give no details about age or maker. Probably the time it was made must be about 1850.

"The carved dentures, two uppers and two lowers, are made from a hippopotamus; the bridge and the pivot tooth are made of ivory (Fig. 6).

"One of the upper dentures, the one which is a little damaged, was found in Copenhagen three years ago when digging out for a new house. It was then discovered that the ground was part of an old cemetery the existence of which was quite forgotten, but it probably was used in 1807 after the battle with the English or in a cholera epidemic in 1840. The latter suggestion is no doubt the correct one. The other dentures, bridge and pivot tooth were left me twenty years ago by an old dentist.

"I am told that as late as 1880-1885 a hippopotamus carved upper denture was made for a leading old person in Copenhagen who was accustomed to this kind of denture and would not take one in metal or rubber, but, as far as I can ascertain, it was a quite isolated case."

(The illustrations are on the following pages.)

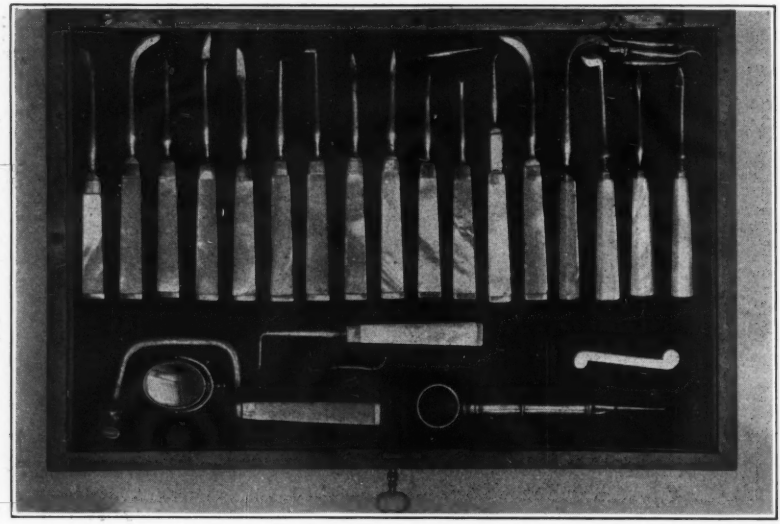


Fig. 1
Instruments in use about 1870 to 1875.

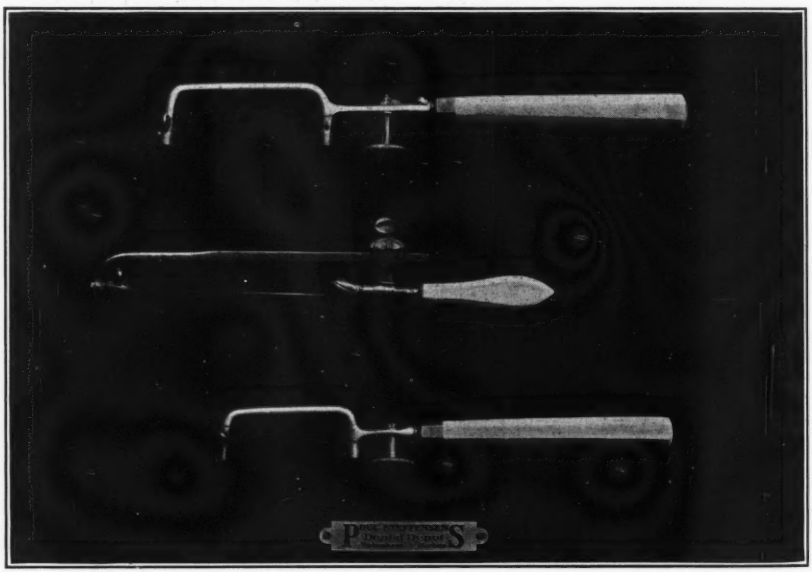


Fig. 2
Tape carriers and separating saws (1870-1875).

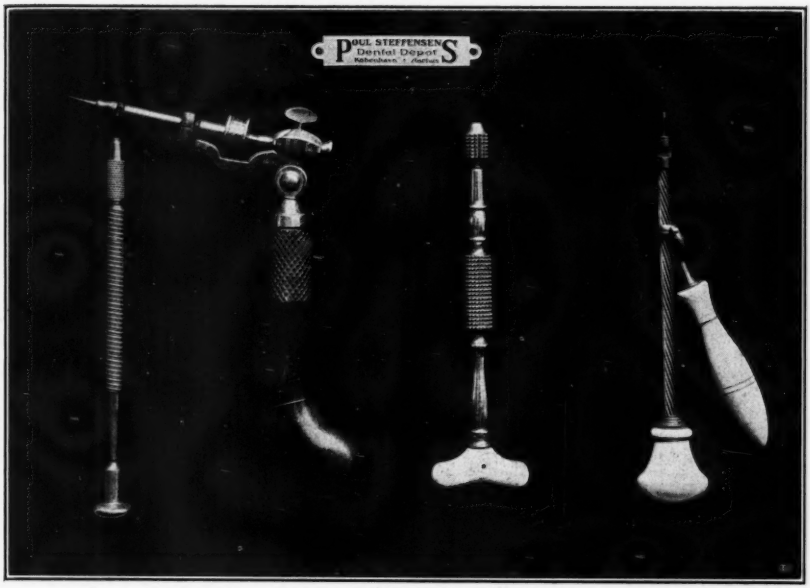


Fig. 3
Drilling-instrument handles (1850).

Fig. 4
Extracting instruments (1850).

Fig. 5
Instruments in use about 1850.

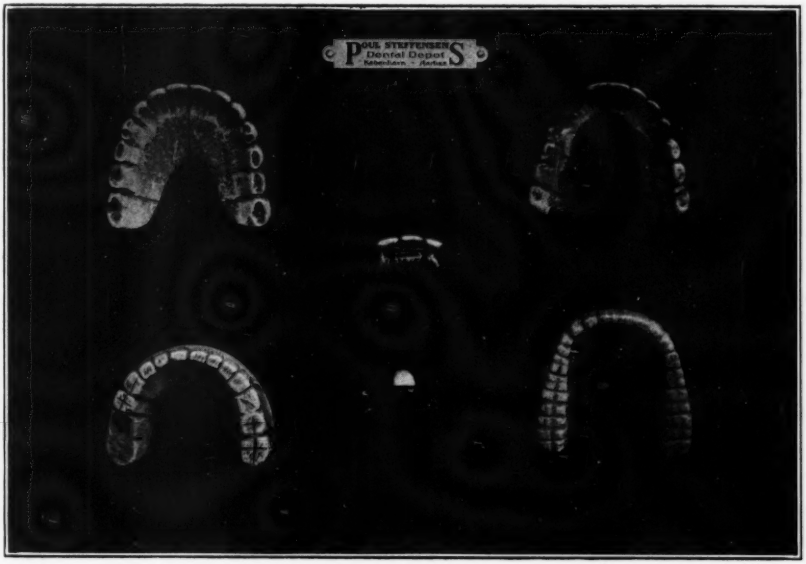


Fig. 6
Carved dentures and bridges (1807-1850).

A Survey of the Dental Clinics in Greater New York*

By BERNARD GREENSPAN

School of Dental and Oral Surgery, Columbia University, '31

Desiring to review the clinical facilities in terms of the community's needs and to bring the information regarding dental service in Greater New York up to date, the New York Tuberculosis and Health Association, through its Community Dental Service Department, undertook to make a survey. The last previous survey was made in 1923 and since then many new dental clinics had closed, others had been opened and a few had changed the quality and quantity of their service. Furthermore, since many facts which were closed to the surveyors of 1923 have been willingly opened, the present study is of even greater value and more definite use than was the former.

Dental Care and Health

The emphasis today in the dental field, as in the whole field of health work, is on prevention. Curative work and reparative work are necessary for the adult with tooth and mouth disease. The health-worker in dental hygiene looks forward to the time when preventive dentistry will lessen the need for mechanical devices and artificial teeth, which at best are poor substitutes. Such a program will institute proper nutrition for the pregnant mother and for the infant, followed by dental care from the age of two.

Scientists are today recognizing the far-reaching effect which diseased mouths have on the health of patients. Many systemic diseases have been traced to oral infection. The physician and the dentist have found that cooperation between them is necessary for constructive health work.

Each year records accomplishments in community dental service, yet statistical evidence is abundant that there still remains a great need to be met. In one district, where 580 grammar-school boys whose previous dental care had been almost negligible were examined recently, it was found that the group averaged for each child eight decayed teeth requiring fillings and three teeth beyond repair. The significance of this high figure is increased when one realizes that these children barely have all their twenty-eight permanent teeth, exclusive of third molars, and average eleven teeth, which either need repair or are beyond saving. Such facts show some of the difficulties with which the clinics contend. The delay of preventive work, due to the pressure of curative work, establishes a vicious circle, as it makes more curative work necessary and again delays the really constructive possibilities of prevention.

Types of Dental Service

The general plan of the 1923 survey was followed in this study. A trained investigator, not a dentist, personally

* Written for the course in the Theory and Practice of Dentistry.

visited all the clinics in Greater New York known to give dental service. The total amounted to 152 or 48 more than were studied in 1923.

A definition of terms used in describing the work of each clinic is necessary for the understanding of the findings:

(1) *Prophylaxis.* As used in this survey, refers to surface cleanings of the teeth. All authorities agree that there should be at least two cleanings a year.

(2) *Oral Surgery.* Includes all work which requires cutting into the tissues of the mouth to remove tumors, to open abscesses or to do more extensive operations involving the bone.

(3) *Extraction.* Because of the great need for this work and the frequency of its provision it is listed as a separate type of service from oral surgery.

(4) *Operative Dentistry.* Includes restoration of chewing surfaces by filling decayed teeth.

(5) *Root-Canal Therapy.* When decay extends into the pulp cavity, which is continuous with the canal in the root of the tooth, a special kind of treatment known as *root-canal therapy* is given. It is seldom practiced in the clinics but is referred to the colleges or to private practice.

(6) *Plates.* The making of plates or artificial dentures is one means of restoring the chewing surfaces where teeth have been removed and is often necessary in treating medical cases to insure proper nourishment. Plates are less expensive than bridgework and are the only type of restorative work done in the majority of clinics.

(7) *Orthodontia.* The correction of irregularities and malposition of the teeth. For this purpose various types of mechanical devices are used. Irregularity of the teeth reduces masticating efficiency and brings about a predisposition to caries and other pathological conditions of the teeth and their investing tissues. If proper education could be provided for mothers, irregular development of permanent teeth, due to improper food in infancy, thumb-sucking and mouth-breathing caused by adenoids and enlarged tonsils, might be obviated to a large extent, but since there is as yet no way of having such education widely provided, the resulting crooked, badly spaced teeth of children must have care. Orthodontia attempts to correct such conditions.

(8) *Treatment.* Whatever is done for relieving pain, after-care of surgical cases and care of the gums in diseased condition.

(9) *Pyorrhea Treatment.* An important phase of periodontia, which is the care of the soft tissues of the mouth. This treatment is being more widely provided by clinics than it was four years ago, so it has been included in the tabulation of services.

ONE HUNDRED AND FIFTY-TWO CLINICS

The survey discovered 152 clinics in Greater New York, operating under various public and private auspices, offering some type of dental service in 1927. The available services ranged from extractions only or prophylaxis only to the most complete provision for dental care, including orthodontia and treatment for pyorrhea, two highly specialized services. The most complete service found is offered by seven institutions, five hospitals and two colleges, and includes oral surgery, operative dentistry, prophylaxis, orthodontia and pyorrhea treatment. The most common combination of types of service includes extractions, prophylaxis and operative dentistry and is provided in 75 clinics. In this group of 75 there are 33 schools, the largest group found where like institutions are doing like work. Of the remaining clinics 48 offer services more complete and 29 offer services less complete.

A list of the clinics, divided according to the type of institution conducting the work, falls into the following classification:

Hospital clinics	60
(17 serving in-patients only, 43 serving out-patients)	
Unattached clinics	13
College clinics	2
Health-agency clinics	8
Family-welfare-agency clinics	9
Settlement clinics	8
Church clinics	6
School clinics	39
Institutional home clinics	6
United Workers' Cooperative Association Clinic	1
Total	152

There were 15 clinics in operation in 1923 which had been discontinued when the present survey was made.

Clinics not included in the 1923 survey which form a part of the 1927 study number 63.

Clientele Served

In New York State it is an offense punishable by fine for any person to obtain medical or surgical treatment from any licensed dispensary (or clinic) on false representations (in regard to ability to pay private office rates). Necessarily, therefore, the clientele of many of the clinics in operation must be limited to a fixed group of people. Limitation is still further enforced by the individual clinics so that they may serve the group or groups for which they were established. About half of the clinics restrict their clientele according to residence in a geographical area, which varies from a school district of one or two city blocks to the United States Veterans' Bureau district in which Greater New York is situated. Many of these same clinics and many others not enforcing geographical limitations operate for the benefit of a definite group of people, such as club members in a settlement house.

Among the 60 hospitals studied the dental services of 17 serve only their bed patients, and three of these are Federal hospitals admitting only cases entitled to government care. Of the 43 hospitals operating out-patient departments four serve only patients referred from the hospital or other out-patient department clinics, and three are Federal hospitals limiting their service to government cases. One of the 13 unattached clinics is a naval dispensary, the service of which is available only to government cases. The dental-college clinics do not recognize the limitations of clientele made by the state law quoted, since college infirmaries are regulated only by the laws governing teaching institutions.

Of the eight health-agency clinics one accepts school children only, another serves tuberculosis contact cases, and a third limits its clientele to children from member organizations. Six of the nine family-welfare-agency clinics are limited, one to persons with organization connection, one to clients of the Association for Improving the Condition of the Poor, three to tuberculosis contact cases and one to children of member organizations. Four out of eight settlement-house clinics restrict their clientele to members of their organization. Three church clinics out of six serve members only.

The 39 schools maintaining dental clinics admit only school children, and some of these further restrict their admission to children in the lower grades. All six institutional homes serve only their inmates. The United Workers' Cooperative Association conducts a clinic exclusively for its members.

Sixty-five clinics, or 42% of the total number, are established to serve children only. All of the schools, children's institutions and hospitals, and a few settlements fall into this large group. Only 12 clinics exclude children, these being the Federal clinics for service men and hospitals which are specialized to serve adult ills. The remaining 75 clinics, representing about half the total, are open to both children and adults. In the 152 clinics studied it was

found that 43, or slightly less than a third, serve all members of the community eligible for dispensary care, with no restrictions of any kind.

DENTAL WORK IN THE CLINICS

Hospitals. The increasing number of dental clinics in hospitals is due to the realization of the distinct contribution which oral hygiene brings to the cure of disease. It has already been noted that of the 60 hospitals maintaining dental clinics 17 serve only their bed patients. This service ranges in the various institutions from the emergency calls to relieve pain to the most advanced dental policy, wherein the hospital recognizes the importance of oral hygiene in every case under treatment and conducts a dental department to cooperate with physicians and surgeons in the fight against disease. More than half of the hospitals now have dental departments on an equal footing with the departments of the other specialties of medicine. There are 43 hospitals which serve out-patients as well as in-patients. Five of these offer complete dental care in their clinics, while 12 others offer everything but orthodontia and pyorrhea treatment. Routine mouth examinations are now conducted in 26 hospitals for all ward patients or for a special group, such as children or the tuberculous.

Unattached Clinics. The 13 unattached clinics are comparable in many respects to the dental clinics in the outpatient departments of hospitals, except that they offer no bed service. Their general practice is to admit patients for dental care only, instead of having them referred from other departments.

Dental Colleges. Both dental colleges, the Columbia University School of Dental and Oral Surgery and the New York University College of Dentistry, offer to the community all types of dental service at cost price of supplies. The work is done by students under supervision.

Forty student oral hygienists from Columbia performed 13,383 cleanings in 1926-1927 in selected schools where no permanent clinic was maintained and in the college clinic. Besides thorough prophylaxis, the hygienists gave much time to toothbrush drills and instruction in mouth hygiene—educational work which should find a place in the school curriculum.

Health Agencies, Family-Welfare Agencies, Settlements and Churches. The emphasis in the dental clinics of health and family-welfare agencies, settlements and churches has been on children's work. Out of 31 such clinics 26 perform extractions, fillings and cleanings, while the remaining five include other services, such as pyorrhea treatment, orthodontia and oral surgery. Fifteen clinics in these classifications, or almost half the full number, admit no adults.

Schools. There are now 39 schools in which dental work is being done. The Department of Health sponsors clinics in 19, the Children's Aid Society in nine, parent-teacher associations in five, student organizations in two and Judson Health Center in one.

The Department of Health formerly reached 20,000 children yearly through its 19 clinics, doing cleanings, fillings and extractions. There are nearly 1,500,000 school children in Greater New York. This year the Department of Health has instituted a new dental

policy to conform with the medical policy already in effect. In every school having dental equipment, of which there are now 116, a diagnostic and prophylactic service is to be offered. Each child examined will take home a chart showing the dental defects and a message from the dentist urging the parent to have the child's teeth taken care of immediately. Re-examinations every six months are planned to see what improvement has taken place and what remains to be done. On Saturdays the 19 clinics previously operated will be open for curative work for school children. A definite procedure for children's work has been adopted and calls for the following services to be given in the order indicated: (1) prophylaxis, (2) removal of unsavable teeth, (3) filling of pits and fissures before they become carious, and (4) filling of decayed permanent teeth. Such a procedure for children, carried out in connection with a general health program should give more tangible results than have been shown in the past with the prevailing lack of uniformity of procedure.

The result of this changed policy, it is hoped, will be to bring to an increasing number of children and their parents the realization of the need for dental care. This educational pressure will doubtless increase the number of patients visiting private dentists and dental clinics.

Institutional Homes. The six institutional homes included in the survey maintain dental service for their inmates only, and the type of service is fitted to the needs of the institution. The Brooklyn Hebrew Home and Hospital for Aged provides complete oral surgery, operative dentistry and prophylaxis. The other five institutions provide operative dentistry and prophylaxis, but limit their oral surgery to extractions.

United Workers' Cooperative Association. In the Bronx a community of about a thousand families is organized for mutual benefit as the United Workers' Cooperative Association and maintains a dental clinic to serve its members, offering complete service with the exception of orthodontia and pyorrhea treatment.

Industrial Clinics. Industrial clinics, maintained and operated within specific industries for employees, have not been included in this survey. There are many in existence, but their services are limited to a restricted group, which is informed of its privilege, so it was not considered practical to list them in this study.

The Need for Complete Dental Care

Although the clinics differ vastly in the services offered, it has already been noted that out of 152 there are 123 clinics doing extractions, prophylaxis and fillings; 48 of these add other important services to their program. There are, however, only seven institutions among the whole number which offer complete dental care, including x-ray examination, oral surgery, operative dentistry, prophylaxis, orthodontia and pyorrhea treatment. In 145 clinics the program is less complete, omitting from one to all but one of the services. When a patient requires such types of service to complete his case as are not provided in the clinic in which he has been treated, he should be referred elsewhere for the completion of his work. This is

being done in very few places and represents a real social need. Isolated pieces of health work in dentistry or in any other branch of medical practice do not benefit the patient as does a comprehensive health service. A clinic which only extracts teeth, for instance, has not finished its work if, after the extraction of the unhealthy teeth is completed, the clinic fails to advise the patient where he can get substitutes which will restore his chewing efficiency.

Figures compiled on the mouth conditions of school children who have had no previous dental care show that 75% to 95% have decayed teeth. This high percentage proves that preventive dentistry must start with the pre-school child, since the majority of children enter school with decay already present and in many cases at an advanced stage. Health education in oral hygiene, therefore, must be planned to reach the mother of the pre-school child. To reach this unorganized group is the problem which faces health-workers.

Hygiene is a required subject in the school system. Hygiene of the mouth is an important section and decidedly should have a place in the teaching curriculum. To produce results, health education in oral hygiene must begin with the expectant mother, be carried through the pre-school period and the child's formal school education and continue by means of general publicity throughout the post-school age.

Authorities agree that the two-year-old child is not too young for his first visit to the dentist. From then on the individual who would grow and keep healthy teeth and maintain a clean mouth should visit a dentist at least twice a year.

ADMINISTRATION OF CLINICS

The technical service offered by a clinic and the administration necessary for the operation of the clinic are two distinct fields and should be definitely divided. For the technical operator, dentist or hygienist the patient and his needs should be the focus of attention; on the other hand, costs, records, equipment and other details of administration should be attended to by a person or persons not concerned with the actual work of treatment. The clinic serves the patient best where a separation is made between technical and administrative operation. The best technical treatment is available under efficient administration.

PROFESSIONAL SUPERVISION

The meaning of professional supervision was not generally understood in 1923. Forty-five per cent of the clinics reported having supervision, but the prevalent opinion was that supervision meant watching the operators, who were supposedly competent graduate dentists. Because of this general impression a professional committee working under the auspices of the Committee on Dispensary Development stated: "By supervision the committee does not mean occasional fault-finding inspections or the establishment of a board supervisory in name only. Professional supervision is the regular contact of a consultant or supervising dentist or body of dentists with the dentists who are performing the actual work in the clinics. Professional supervision consists in assuming responsibility for the quality of the work turned out and in availability for consultation; but, more

than that, it means a constructive interest in the work, which develops a stimulating morale. Work supervised in this way not only maintains its permanency, but also builds for future development."

This understanding of supervision is now more widespread. In the present survey 56% of the clinics were reported as having professional supervision.

Technical Personnel

In addition to the supervisor, the professional personnel of clinics is made up of operating dentists and hygienists. At least one licensed dentist is connected with each of the 152 clinics included in the study.

The dental operators may be volunteers, paid workers, interns, externs, or combinations of these. The majority of dental clinics now offer some payment to part of the staff. The amount of pay ranges from 75c to $7.00 per hour. The most usual rate is about $2.50. Those who are not paid are supervisors or hospital staff members who find compensation in the experience in special phases of dentistry which are less common in private practice.

Interns, who usually spend one year as residents in hospitals, are provided with board and lodging and in some instances a monthly allowance. The policy of routine mouth examinations with follow-up care to remove focal infection is responsible for the increased use of resident dentists to perform that service. In 1923 there were 12 dental interns, nine of whom were in the Bellevue and Allied Hospitals. In 1927 there were 20 distributed as follows: one each in Beth Israel, Fifth Avenue, Fordham, Gouverneur, Lenox Hill and Presbyterian Hospitals; two each in Greenpoint, Polyclinic and Post-Graduate; three in Lincoln, five in Bellevue.

Hygienists were employed in 32 of the 104 clinics in 1923; in 1927 in 50 out of 152 the percentage of clinics thus staffed remained about the same. In most cases the hygienist is obliged to divide her time between the strictly professional work of cleaning teeth and administrative duties. This is true especially in the smaller clinics where there is no clinic attendant and the hygienist is primarily the clinic executive. The work of the hygienist is still largely with non-medical institutions.

The duties of the administrative personnel, whether the staff consists of one or more, include all the duties connected with a clinic except the actual technical work done by the dentist or hygienist and the recording of that service on the patient's chart. In the *Tentative Standards for Dental Clinics* it was stated that each clinic should have a permanent attendant responsible for sterilization, cleanliness and any assistance the doctors may need. This is true now of all the clinics reported in this study. Even the hospitals where student nurses formerly manned the clinics now recognize that the clinic patients get better service and the nurses obtain better experience where a permanent attendant directs the clinic activities.

The State Board of Charities, which licenses the clinics, sends out field representatives to inspect the different institutions annually and to rate them according to "Plant" and "Administration." The clinic administrator in most cases has no control over the "Plant" supplied, but is entirely responsible for the condition in which the equipment is

kept and the physical appearance of the clinic as a whole. There are two requirements under "Administration," one that an alphabetical card file with case numbers of all individuals reporting for service be kept, the other that the active case histories be kept numerically. Many of the low ratings received year after year are due to failure to comply with this regulation. Information about the ratings is confidential and is supplied only to the institution concerned.

Besides caring for the physical appearance of the clinic and filing records, the administrator's duties include assisting the dentist, giving the patient a return appointment, following up broken appointments, ordering supplies, sterilizing instruments, tabulating daily records and collecting fees.

The distribution of these duties ranges from the clinic where one hygienist performs all the tasks enumerated and does, in addition, some of the technical work for which she is trained to the large clinic with a registrar, file clerk and attendants to assist the dentists.

RECORDS

The keeping of the records in every clinic is essential to satisfactory administration. Apart from measuring the service to the individual patient and to the entire group served, records furnish a means for comparing one clinic with another and estimating each clinic's community value in terms of accomplishment (as related to its potential service or to the community needs). Records provide also invaluable research material for the study of the dental clinic's contribution to public health and correlation to medical clinics. Because oral hygiene is being recognized as a preventive factor in systemic disease, records pertaining to the operation of a dental clinic have an important bearing on community health studies. There are so many different kinds of records in use that it would be a distinct advantage to have a form devised in cooperation with a statistician, thereby assuring its usefulness in tabulating results and making comparisons. Supervision over the filling in of records is also necessary in order to insure the recording of sound objective data.

Two types of records are necessary, that of the individual patient and that of the summary of clinic work. The patient's record, if it is to be a contributing factor in his treatment, should include any social and medical history bearing on clinic treatment, an entry of every visit and every operation performed, together with fee charged and any other information which the clinic needs in connection with the treatment. All entries, except operations performed, may be made by the record clerk. Operations performed should be entered by the operator. In case of difficulties concerning the visits made, treatment given and fees charged, the accurately kept record protects the clinic. The social and medical history is often a valuable factor in diagnosis of oral disease.

Only one clinic kept no individual patient records in 1923. It should be noted that this clinic has since installed such a record system. The 1927 survey shows six new clinics which have not yet installed the individual patient records. Where such records are kept, the form varies from the very simple index card

to the four-page questionnaire. The clinic records or day-by-day tally-sheets vary in terminology and content from clinic to clinic, so that the very valuable information they contain is not comparable for clinics throughout the community. Such tally-sheets were kept by 39% of the clinics in 1923 and by 40% in 1927. The 1927 survey found 30% of the hospitals, 47% of the unattached clinics and 48% of all other institutions employing this method.

A quantitative study of clinics based on tallies kept is made impossible, because 60% of the clinics keep no such tabulation and the other 40% use no uniform method, and thus the facts gathered are isolated and not available for comparative or summary purposes. Even such figures as have been used must be given only as approximate estimates, which cannot be accurately checked.

The clinic summary can be easily made daily on a tally-sheet from the individual patients' cards. It should include the number of patients admitted, the number of visits made, the number of services offered each patient and the dentist's and hygienist's chair-hours. If totals are compiled in monthly reports, the annual report becomes a comparatively simple piece of work and is accurate.

Visits to Clinics

To find the number of visits per patient becomes an easy matter when such records are kept. A record of "one-visit cases" should be a danger-signal to the dental clinic. It indicates that the service is not adequate, since complete dental care necessitates more than one visit for each case. One clinic, having the highest rating for plant and administration from the State Board of Charities, was carefully studied over a period of two years. Its average number of visits for each patient was seven, and there is every reason to believe that such a number represents a fair average, if not the minimum, for complete dental care.

The State Board of Charities licenses and rates all dispensaries, i. e., "persons, corporations, institutions, associations or agencies whose purpose is to furnish to persons non-resident therein, either gratuitously or for a compensation determined without reference to the value of the thing furnished, medical or surgical advice or treatment, medicine or apparatus, the funds for which are provided from sources other than the persons actually engaged in the distribution." Such dispensaries include those studied in this survey with the exception of some hospitals serving only bed patients, the clinics maintained for students by school administrations and institutional homes. Of the 106 dental clinics of this survey not exempted according to the terms of the law, and therefore licensed in 1926, the report of visits for that year totaled 310,973. This report did not include a report from every licensed clinic.

The reason for failure to report dental visits is due to the fact that many institutions maintain other types of service and report only a total of visits for the entire institution instead of separate figures for the different specialties.

Unlicensed clinics reported 30,613 visits for the same period. The combined figures present a total of 341,586 visits reported by 99 dental clinics.

The State Board of Charities requires also from licensed dispensaries the number of individuals treated. In very few institutions, however, are figures so reported as to show accurately the number of different persons cared for in the clinic during a given period. It has been found impossible, therefore, to use the number of patients treated in any comparison of dental clinic services. Improved statistical methods on the part of the clinics would make such a figure available.

FEES

The common admission fee to the dental clinic is 25c. City and Federal institutions, hospitals serving bed patients only, schools and institutional homes could not be considered in a study of fees, since they are restrained either by laws, as in the case of the city and Federal institutions, or by the nature of their clientele, as in the case of institutional homes, from charging fees.

In the 74 clinics not so restricted the range in admission runs from no charge in the case of 23 clinics to a fee of $1.50 for one clinic. As has been noted, the charge of greatest frequency is 25c, which occurs in 28 clinics.

In many clinics the initial admission fee either is remitted from the final bill or covers one of the services received by the patient. For prophylaxis, fillings and extractions the most usual fee is 25c for each service, the complete range being from 10c to $1.50. This was also the usual amount in 1923, but at that time more clinics charged under 25c, and a lesser number charged over 25c in 1927. The general trend, although the charge of greatest frequency remains at 25c, is toward the larger fees.

EXPENSES

The expenses for operating a clinic include overhead, equipment, salaries, supplies, repairs, laundry, cleaning. Figures on the cost of operating dental clinics were not generally available. Cornell Clinic and the Allied Dental Clinics report themselves partially self-supporting. Few clinics approach self-support, but rely on the funds of organizations sponsoring them or affiliated with them. The Allied Dental Clinics, which have been operated as a demonstration by the New York Tuberculosis and Health Association, have kept a careful cost-accounting record. Exclusive of all plant costs, such as heat, light, rent and original equipment, and inclusive of a rate of pay considerably below the average for professional service, the Allied Dental Clinics have found that the cost of dental care, although varying from time to time, falls between $3.00 and $3.50 an hour.

POLICY

Administration is greatly facilitated by a clearly defined policy. The survey of 1923 revealed a lack of planning both in fitting the dental service into the general organization and in defining the types of service and determining the choice of patients to serve. It is impossible to measure the effect of planning at the present time. However, there is evidence of more supervision, both technical and administrative, and in hospitals more use of the dental service by other departments and more

use of central record systems, so that the patient's mouth condition may be studied in relation to his general condition.

In the matter of choice of patients a definite step was taken recently by the Associated Out-Patients Clinics Committee. It recommended and urged that every hospital maintaining a dental service should adopt a definite priority schedule for the selection of cases, as follows:

(1) Dental service for in-patients should be furnished as a prime responsibility. This should include complete diagnostic service, with x-ray, surgery and operative work sufficient to eliminate focal infection in the mouth.

(2) There should be ambulatory patients (out-patients) whose medical condition requires dental attention for its adequate care, and who are referred to the dental clinic by other clinics (medical, surgical, children's, etc.) in the out-patient department.

(3) Ambulatory patients who apply for dental work only, or in whose behalf charitable or health agencies apply, should be third in order of priority. They should be received in so far as facilities permit after attention has been given to Groups 1 and 2. It is always understood that emergency dental care for the relief of pain shall be furnished any applicant.

It is understood that any clinic requires a clearly defined policy, but the non-hospital clinic is not bound by the same limitations as to choice of patients as the hospital clinic.

A joint committee made up of representatives from the Second District Dental Society, the Kings County Medical Society and the Queens County Medical Society was formed in 1927 for the purpose of working out relationships between the two professions in their clinic work. The first activity of this committee was the formulation of standards covering organization, policy, supervision, records and equipment for dental services.

This seems to be a formative period, but the trend is toward clearer-cut administration, better quality of professional service and, therefore, greater service to the community at large.

Dental services have close relation to other forms of medical and health work. The child-health activities of official and voluntary agencies and their programs directed against tuberculosis and heart disease include dental service. Dental-hygiene education is a part of the broader program of general health education promoted by numerous agencies. The care of expectant mothers, furthered as a vital part of the campaign for maternal and infant health, involves adequate dental service during pregnancy as an essential element. The interdependence of medicine and dentistry in these and other ways and the cooperation needed among physicians, public health workers and dentists will be brought out more fully in the Health Inventory of the Welfare Council than is possible in this specialized report.

Summary

The increased number of clinics from 104 in 1923 to 152 in 1927 represents a proportionate increase in each class of institution considered, so that the relation of the number of hospitals to unattached clinics and the other classifications remains approximately the same. However, the usual tendency for

service to concentrate in Manhattan is again apparent. Of the 56 new clinics established since 1923 35 clinics, or 63%, are in Manhattan; 12 clinics, or 21%, in Brooklyn; 5 clinics, or 9%, in the Bronx; 3 clinics, or 5%, in Queens, and 1 clinic, or 2%, in Richmond.

Limitation of clientele was found to have increased in 1927, so that three-fourths of the institutions instead of one-half now recognize some sort of restriction. This change may be explained by the increased feeling of responsibility for a complete service to a definite group, an attitude noted especially in the hospitals.

The same lack of uniformity in types of services offered at each clinic was found. In both surveys the service combination most often found was cleaning, filling and extractions, about 49% of the clinics offering this service.

Both surveys show that the clinics have been open for use only half the potential time, which is considered to be between 33 and 42 hours per week for each chair. This was not because there was no more demand for dental service, but because of expense or inconvenience it has not been found practicable to extend the use of the equipment to the maximum. A full use of the partially used equipment would aid materially in meeting dental-clinic needs. It should be borne in mind that used chairs only are included in this survey. There are 100 dental chairs, for the most part installed in school buildings, not in use at present. They have been installed and never used or their use has been discontinued for some reason and they are lying idle.

Professional supervision of clinic work increased 11% between 1923 and 1927, so that in 1927 56% of the clinics were under supervision as against 45% in 1923.

The increase in the routine mouth examination of ward patients or special groups in hospitals is notable. In 1923 13% of the hospitals reported routine mouth examinations; in 1927 the number had increased to 39%.

The 1927 survey shows that dentistry has been recognized as a hospital department equal to other departments in 61% of the hospitals studied, a 12% increase over such recognition in 1923.

The previous survey indicated a chaotic state in dental-clinic service. This promoted the drawing up of a plan for community dental service with practical steps to follow in the City of New York. The recommendation that some organization interested in public health undertake as part of its work the advancement of a program of community dental service was adopted by the New York Tuberculosis and Health Association. There has been definite progress along the line of coordination of mouth hygiene teaching with the program of general health education. In the promotion of standards for dental-clinic service and in the working out of relationships with other branches of medicine the work has been greatly facilitated by the creation of a Dental Section of the Associated Out-Patient Clinics Committee of the New York Tuberculosis and Health Association.

CONCLUSIONS AND RECOMMENDATIONS

The major conclusions and recommendations that emerge from this survey are unmistakably clear. They call for wise leadership, constant stimula-

tion, clear objectives and an active recognition of community responsibility. The coming years must see greater progress and wiser planning than the past five years have witnessed.

(1) Dental clinics should be made available to the needy inhabitants of the Bronx, Queens, Richmond and Brooklyn, where the service is even less adequate than in Manhattan.

(2) Existing dental-clinic equipment should be used as fully as possible by extending the hours of use for each chair before additional chairs are installed.

(3) Dental clinics generally need a clearer grasp of the exact ends to be achieved and by what means, a clear definition of their own policy as concerns selection of clientele, professional supervision and standards of administration and records. Attention to the detailed recommendations of this survey is strongly recommended.

(4) Hospitals that have not yet recognized diagnosis and treatment of mouth conditions as a specialty of medicine should be encouraged to establish dental service under the recommended conditions.

(5) A comprehensive city-wide plan for the coordinated development of adequate dental-clinic facilities, especially for children from two to sixteen, is greatly needed. Development of such a plan requires adequate funds to assure competent leadership and the necessary facilities.

DIGESTS

METABOLISM OF THE DENTIN

By Charles F. Bödecker, D.D.S., F.A.C.D., and Edmund Applebaum, D.D.S.

"In summarizing some of these observations from a practical point of view, we note:

"(1) That the pulp is more sensitive to superficial irritation than is generally supposed.

"(2) That secondary dentin not only protects the pulp against exposure by abrasion, but that it also retards the progress of decay by making the dentin less permeable.

"(3) That secondary dentin is not always formed, due to some unknown inactivity of the pulp.

"(4) That opaque zones in the dentin are only secondarily caused by external irritations such as dental caries, abrasion or erosion; they are primarily due to pulpal changes which interfere with the nutrition of the dentin.

"(5) That the tolerance of the teeth for fillings is due to previous structural changes resulting from the irritation of decay. Fillings principally restore the lost tissue, but it is the protective activity of the pulp which reduces the vitality of the primary dentin, making the placing of deep fillings in the teeth of young individuals successful.

"(6) That it may be advisable to insert a temporary filling in sensitive teeth for several months to allow time for the formation of secondary dentin and so reduce the pain in the final cavity preparation.

"(7) That there appears to be not only an efferent but also an afferent circulation in the dentin. Thus mineral salts may not only be stored but also abstracted from this tissue during systemic calcium deficiencies, such as pregnancy or constitutional disturbances.

"These observations indicate that the welfare of the teeth, and particularly that of the dentin, is in close relationship to the health of the body." —*The Dental Cosmos,* October, 1931.

SIGNIFICANCE OF LEUKOPLAKIA

By M. Monte Bettman, D.M.D.

This disease is more common than is generally believed, and the dentist should recognize it at an early stage. It is confined to adults and appears usually during middle age. At first there are pearly white glistening patches on the mucous membrane of the cheeks, palate or tongue. These patches thicken, harden and become hornified. The patient feels no pain nor discomfort. If allowed to progress,

the patches crack and ulcerate and become painful.

The etiology is in question. Some men claim that it is always preceded by syphilis, but there are many cases in which the relationship cannot be proved. Hazen and Eichenlaub state that syphilis is an accidental rather than a causative factor. Brophy states that leukoplakia is due chiefly to the use of tobacco.

The author states that, in his opinion, the primary etiological factor is the excessive use of tobacco. He has never seen a case of leukoplakia in which tobacco had not been used, while on the other hand the Wassermann reaction seems to have no significance.

The prognosis is favorable, so long as the patches do not split or crack. When this occurs, there is danger of malignancy. Bloodgood considers leukoplakia second only to bad teeth as a cause of cancer of the mouth.

Treatment is of little use. Antiluetic treatment has little or no effect. The best results are obtained by eliminating the use of tobacco and spicy or irritating foods.—*The Journal of the American Dental Association,* October, 1931.

THE THERAPEUTICS OF CARBON DIOXID

By Robert Friedman, D.D.S.

Carbon dioxid is a normal physiologic stimulant and maintains the acid-base balance of the blood. When administered to a patient, it stimulates and maintains the function of respiration.

The administration of carbon dioxid raises the blood-pressure slightly, but this returns to normal shortly after the gas is withdrawn. Its use in conjunction with oxygen is of great value during general anesthesia and greatly assists in post-anesthetic ventilation for the removal of gases from the blood.

It decreases post-anesthetic nausea and vomiting and lessens the danger of explosion. It has further use in eliminating poisonous gases, such as carbon monoxid, from the lungs, and it is an ideal stimulant for starting respiration in the new-born.—*Dental Items of Interest,* October, 1931.

Foreign Dental Literature

Edited by JOHN JACOB POSNER, LL.B., D.D.S., New York, N. Y.

DIAGNOSIS AND TREATMENT OF TRIFACIAL NEURALGIA

By Fritz Hartel, Berlin

There are many pathological conditions in both the teeth and the periodontal membrane which cause trifacial neuralgia. Out of 150 cases the author finds that 38% were connected with the teeth. Neuralgia is frequently present in edentulous mouths. Focal infection also is a contributing cause to neuralgia. Sometimes an infection

of the antrum will produce neuralgia. The beginning of a carcinoma in the maxilla also will induce a neuralgia.

The character of the neuralgia is classified as follows:

(1) Secondary neuralgia or neuritis.

(2) Neuralgia as a result of general disease.

(3) Psychopathic neuralgia.

(4) Typical trifacial neuralgia without discernible cause.

As a result of the loss of teeth certain degenerative changes may occur in the Gasserian ganglion. Alcohol injections have been made into the ganglion for relief. In certain cases of carcinoma, which blocked the entrance of the needle, the author successfully injected alcohol into the foramen rotundum through the eye socket.

Neuralgia pains may readily arise from rheumatic conditions brought about through infections in the teeth or tonsils. The neuralgia is not confined to the face. It may rest on the shoulders or the back. Malaria and the use of alcohol may cause neuralgia, and especially the use of nicotin. In young subjects these points are to be kept in mind. Diabetes, nephritis and chronic constipation may be the cause of neuralgia. In people with arteriosclerosis and high blood-pressure trigeminal neuralgia may be present, with a tendency to apoplexy.

In the opinion of the author the treatment of trifacial neuralgia is an injection of alcohol into the Gasserian ganglion. This opinion is based upon twenty years of work in this field and not merely on the fact that it is original with the author.

The radical operation on the Gasserian ganglion or on the sensory root of the trigeminal nerve can be replaced by the safe ganglion injection.

Objections have been raised to the injection into the Gasserian ganglion for three reasons:

(1) There are associated with the injection into the ganglion many unpleasant sequelae, involving paralysis of the eye and muscles of mastication. It interferes with vision and may cause necrosis of the face.

(2) Technical difficulties in making the injection.

(3) Recurrence of symptoms of neuralgia, making an operation necessary.

The author believes that the injection of alcohol, properly made, avoids all these disadvantages. There are several contra-indications to the use of alcohol, as follows:

(1) Technical difficulties, making it impossible to inject.

(2) Conjunctivitis.

(3) Double-sided neuralgia. In these cases the severe side should be injected. The other side may be injected three years later, but in the interim peripheral injections may be used.

(4) Severe diabetes.

(5) Ulceration and infection.

(6) Apoplexy.

The injection should be interrupted if blood appears to run from the needle. If doubt exists as to the exactness of the point of injection, a more careful study should be made. Should abnormal reflexes be present after the injection of novocain, such as impaired vision, the injection is to be interrupted. Faulty injection will be evidenced also

by paralysis of other cranial nerves, such as the abducens, occulomotor or facial.

The author concludes his article with a brief description of the method of injection and brings out that hearing, seeing and feeling play an important part in the correct technic. A case is cited in which eighteen years after an alcohol injection into the Gasserian ganglion none of the trifacial neuralgic pains had returned.—*Deutsche Zahnärztliche Wochenschrift,* September 20, 1931.

CRACKING NOISE AT THE TEMPOROMANDIBULAR ARTICULATION AND ITS TREATMENT

By G. Axhausen, Berlin

The cracking sound at the mandibular articulation is not a disease but merely a symptom. It is rather a frequent condition, and in the past two years the author of the article has seen thirty cases. Eleven were operated upon. It is an annoying condition, and the crackling may be audible during talking or eating. It affects the victim socially and also preys upon his mind. The mandibular joint is occasionally painful. In the morning it feels as if the joint were rusted. At times the patient cannot open the mouth enough to eat breakfast. In some instances trismus sets in, which may last an hour or a day or may become permanent. There is very little literature on the subject.

There is a difference between the sounds which are heard. One sound is heard during the opening movement and the other at the termination of the opening. They are intermediate and terminal cracking.

The intermediate cracking sound is due to the fact that the condyle meets with an obstruction as it moves along its path in the glenoid fossa of the temporal bone. The condyle reaches the obstruction, then pauses and, with additional muscular force, is made to snap past.

The terminal cracking is a result of luxation or subluxation where the condyle passes the complete length of the fossa and past the eminentia articularis, which is the normal limiting boundary of the excursion of the head of the mandible. This dislocation of the mandible with its resulting cracking sound was present in but two of the cases. The condyle passes the eminentia articularis, but the interarticular fibrocartilage, which lies between the condyle and the glenoid fossa, remains behind.

It has been definitely shown that the cracking sound is due to the presence of the fibrocartilage. All the cases operated upon for the excision of the cartilage were successful in eliminating the unwanted sound. Removal of the cartilage shows it to be roughened instead of smooth. There is no evidence of inflammation. The entire process is an indication of approaching arthritis deformans.

Every case of cracking noise at the articulation does not require operation. Sometimes the roughened surface may become smooth again and the noise disappears.

The operation of choice is to remove the interarticular fibrocartilage. This

particularly does away with the cracking noise. With the removal of the cartilage the obstruction which causes the noise has more room in which to pass. Eleven cases operated upon by the author were completely successful.

Stretching exercises are of value in keeping up the normal opening width of the mouth in those cases where trismus has been of long standing. The operation is not a simple one, but is complicated because of the presence of the facial nerve in the area of operation. The author prefers to do his cutting a little posterior to the opening of the ear instead of right in front of it, where the joint is located. The articulation is laid open and the operation for excision of the cartilage proceeded with. Injection of alcohol into the area has been tried, but with little success. It is usually complicated with facial paralysis.—*Deutsche Zahnärztliche Wochenschrift,* August 20, 1931.

DIAGNOSTIC ERRORS AND THEIR CONSEQUENCES

By L. SCHUBERT, Dental Clinic, Cologne

The author stresses the importance of proper diagnosis in diseases and complications involving the mouth and teeth. Faulty diagnosis often leads to an unnecessary operation and a long delay before the proper treatment can be instituted.

In a case reported, a student came to the clinic with an abscess in the first-molar region. It was followed by swelling of the cheek and trismus. The abscess was incised by a physician and a quantity of pus evacuated. The swelling persisted and this time the incision was made through the cheek. It was dressed and treated for two weeks, and the diagnosis was fistulous cyst of the cheek.

When the patient came to the clinic, the fistulous opening was still present. A probe entering the opening in the cheek could be directed posteriorly and came out in the soft flap of tissue overlying the *third molar!* The other molars were in place.

The third molar was removed and in three days the area cleared up. Faulty diagnosis was the cause of needless surgery, suffering on the part of the patient and delayed cure.

Three cases are cited in which chin and cheek fistulas due to dead and defective teeth were diagnosed as tuberculous disease of the jaws.

In another instance severe neuralgic pain was treated unsuccessfully. X-ray showed a deeply impacted third molar with its apex in the mandibular canal. Upon the removal of this tooth all symptoms disappeared, although the patient had suffered sixteen months before a radiograph of the teeth was taken. Many cases referred to by the author were diagnosed as trigeminal neuralgia but in reality were of peripheral origin, and the cause was ultimately located in and about the teeth —as a rule, an unerupted tooth.

In a case reported, a patient had had a tooth extracted because of a swelling. The removal of the tooth gave no relief. An x-ray showed a fracture of the mandible at the angle and just posterior to the place where the tooth was removed. It would appear at first blush that the dentist in extracting the tooth caused the fracture, but the

patient admitted that he had been playing football and had been in collision with another player just before he came to the dentist for the extraction.—*Deutsche Zahnärztliche Wochenschrift,* September 20, 1931.

FOCAL INFECTION AS A CAUSE OF GENERAL DISEASE

By Prof. D. Julius Citron, Berlin

Where there is an acute pus-producing process on the skin or mucous membrane which has access to the outside, the individual is safe from focal infection. But when a similar process becomes active in the deeper structures, the pus formed is carried to other organs by the blood stream or lymphatics and a secondary infection occurs. The most frequent positions for such focal infection are the tonsils, carbuncles on the skin, the region of the teeth, and the prostate.

Pyorrhea is also offered as a source of infection by many workers in this field, including Paszler and Rosenow. The author does not agree with them and believes that pyorrheal pockets can discharge easily into the mouth and therefore do not give rise to secondary infection.

There is still considerable difference of opinion regarding the work of Rosenow on focal infection. Paszler sets forth a list of nearly fifty diseases which he asserts are caused through focal infection. These include palpitation of the heart, nephritis, iritis, dyspepsia, gastritis, neuralgia, eczema and conjunctivitis. He classifies the diseases. They may be caused by the direct action of the bacteria themselves or their toxins upon the organ. These diseases are pharyngitis, the common cold, grippe, nephritis, iritis and others. In certain other diseases there is a direct tendency of the patient toward that particular disease.

A case is reported of a patient who suffered from urticaria, which had persisted for a month. The entire face and neck were swollen and the eyes could hardly be opened. All treatments by physicians were unavailing. Upon the removal of several infected teeth with granulomas the patient made an immediate recovery.

Other diseases grouped together are those with general indications of infection, whether with or without fever. These are the nervous patients who suffer from loss of sleep, dryness of the skin or tendency to sweat, secondary anemia, etc. In another group are to be found diseases of the intestines, such as colitis.

The author makes a strong plea for the live pulp and says that it is up to the dental profession to watch patients with devitalized teeth in order to check any systemic condition that might have its origin in the pulpless tooth.—*Schweizerische Monatsschrift für Zahnheilkunde,* August, 1931.

DENTAL ECONOMICS

What is the Future of Our Profession?*

By GEORGE WOOD CLAPP, D.D.S., New York, N. Y.

You will recall, dear Doctor, that long ago you wrote me that dentistry is a profession, a WHOLE profession (probably meaning that it is independent of other professions), and nothing but a profession. You wrote thus because you had taken offense at my statement that dentistry as a means of livelihood is a business. My reply was that if dentistry is all you say it is, some of us who have been working many years to bring somewhat such a condition about would like to know it. The articles which have appeared in this series have been devoted to finding out whether or not you are right.

In these articles we have studied definitions of a profession and a craft on the one hand and of business on the other, and some of the more important differences among them have been briefly set forth. We have studied also the economic and professional significance of oral disease to its victims and the significance to us of our attitude toward it from the professional and economic points of view.

We have found that, in spite of the fact that there are more than 65,000 dentists in the United States and more and more active toothbrushes than can probably be found in any other country in the world, together with more dentifrice advertising, there are probably 90,000,000 victims of oral disease.

There is no unanimity of opinion among us as to what causes oral disease or how it is to be prevented or cured. Some of us are for the balanced ration and others for the orange-wood stick and powdered pumice. Some of us look on the mouth as a barometer of bodily health and others as a cavity into which we may put a steadily increasing number of fillings at steadily advancing fees. Even when the teeth are gone, we can insert a series of dentures adapted to the steadily proceeding resorption.

Dentistry has been a boon to about 2% of our population, a means of relief to perhaps 10% or 15% more and a dream to such of the others as have had the intelligence to dream about it.

The American public has never been dentally conscious, but it is slowly becoming so, thanks very largely to the activities of those who have something to sell. We have now reached the stage where the lower 30% of the upper

* This is the ninth and last of a series of related articles. The first appeared in the January issue.

half of the population probably spend about $2.00 each per year in dental offices.

The young dentist of today enters upon his practice with an investment of about $13,000 in special dental education and equipment. Not half of these dentists will ever get it back in such form that they can leave it as an estate, when they die, and thus quit even.

There is something wrong in the scheme of things when 90,000,000 people need health service which they cannot buy, and when 65,000 who want to serve cannot get the chance. Somebody is going to rearrange some things, and there are signs that the beginning is not far off. It might be better for all concerned if *we* anticipated the necessity and did some prearranging.

Changes in Practice

Practice is changing character rapidly. We older men can see it more plainly than some of the younger ones, and if we are not careful, we are going to find ourselves sitting on the sidelines—ruled out of the play. More and more we are being compelled to seek causes for oral disease outside of what we were brought up to think of as the province of dentistry. More and more we are being forced to seek means of prevention there also.

Statements of causes that would not have been made ten years ago or, if made then, would have had no hearing are now backed up with a most suggestive weight of evidence. The number of dentists who accept nutritional deficiencies or metabolic disturbances as effective causes of maxillary deformity, caries, pyorrhea and apical abscesses is steadily increasing. Do these men still look to more toothbrushes and more brushing as the sole means of oral defense? They do not. They are thinking in terms of wise living and reasonable oral care both in the dental office and at home.

If some of the most important causes which make oral disease possible arise outside the mouth, and if some of these things on which we must depend, at least in part, for prevention and cure arise outside the province of dentistry as we have known it, do you still hold that dentistry is a WHOLE profession in the sense that it is independent of other professions?

If dentistry brings financial success to those who join good business methods with even moderate professional skill and financial failure to those whose business methods are poor, even though their professional skill is great, do you still insist that dentistry is a profession and nothing else?

A Glance Down the Future

If you have had the privilege, as I have had during the last quarter-century, of friendly contact with thousands of dentists, and if you have marked at all the progress of these things that have just been mentioned, can you not cast an eye down the future and, judging by what has gone before, dream of some of the things that are to come?

Can you not see that the dentist as a repair-man has probably reached his high-water mark? He will shine brilliantly for a long time, but there is a steadily increasing number of men to

whom prevention means more than it ever did before. The multitude of them is rising like a resistless tide. In the midst of this financial depression which has engulfed the whole world their practices are coming through better than most of the craftsmen.

Some of the ideals of 1929—few patients, short hours, high fees, three afternoons a week for golf—may have to pass away and we may have to get back to the conception of a professional diploma as a work-ticket calling for industry, instead of speculation, and to thrifty living to provide a comfortable old age.

Can you think of a day when the profession, through its properly constituted organizations, will busy itself in the education of the public and in public service to a degree now unknown?

Can you dream of a day when millions of people who could not afford dentists as repair-men will live so wisely that the dentist as a servitor of health will be a means to an important and welcome economy in their lives, and when sound dentitions throughout life will be the rule rather than the exception?

I can dream thus, though I may not live to see it. When that day comes, dentistry will be a profession in the true sense of the word. But it will not be a WHOLE profession, in the sense of being independent of other professions. It will be interwoven with all the others.

Dentistry will not have lost stature. It will have gained.

Don't Let Your Accounts Become Outlawed!

By CARLETON CLEVELAND, D.D.S., Highland Park, Ill.

Few dentists can be found who do not have, even in prosperous times, a few accounts that are difficult to collect; but in periods of depression, such as the one through which we are now drifting, the number of such unprofitable accounts increases. There is a pronounced tendency on the part of many to neglect paying debts contracted for at a time when business was not quite so bad. This in some cases may be due to necessity. People are short of funds, incomes have been cut off because of unemployment, or people perhaps have lost money because banks have closed and swept away savings laid by for the proverbial "rainy day." Such cases one can sympathize with.

On the other hand, a period of stress offers the unscrupulous person the opportunity to take an unfair advantage. Although such a person may be able to meet his obligations, he will try to reap a profit because of general conditions, pleading inability to pay, thus leaving his creditors to "hold the bag."

The dentist who has been caught with "much on the books" may through the persistent stalling of a dishonest debtor become an innocent victim of the statute of limitations operable in his state.

The statute of limitations generally operates to cover various specifications of the law. Not only do the periods of the limitation differ in the various states, but because of legislative changes they may vary from time to time within a state. It can therefore be seen that it is important that one who has outstanding accounts, as frequently happens in dental practice, should make it a point to become familiar with the statute of limitations in his state as it pertains to the collection of unpaid bills. The law usually provides a specific time—three, four, five years, or perhaps longer—in which an account may be lawfully collected. After the expiration of this period the account becomes legally "dead," and suit for its collection cannot be instituted.

All this naturally brings us to a discussion of what may be done to overcome or "toll" the statute of limitations. In other words, what action is open to the dental practitioner in his efforts to keep his unpaid accounts alive during periods of stress and stringency?

In the attempt to keep an unpaid account alive it is always a good plan, whenever possible, to obtain from the debtor some reasonably definite promise as to just what he proposes to do regarding the discharge of the unpaid balance. A mere promise to settle the matter, even though given in writing over the debtor's signature, is not always sufficient. For instance, in *Allen vs. Hillman, 69 Miss. 225* or *13 South 871,* it was brought out that a letter which merely acknowledges an indebtedness but does not refer to any particular account or even mention the amount of indebtedness is not sufficient to set aside the operation of the statute. In the same manner such promise to pay as "when I get to work" or "as soon as I am able" is generally held to be too indefinite to take a case out of the statute of limitations.

Promises made during a telephone conversation between the creditor and the debtor do not generally hold because of the absence of a corroborating witness. Where the dentist's office is equipped with two telephones or with a switchboard, arrangements may be made to have the assistant or some other reliable third person "listen in" on the telephone conversation, later acting as a court witness.

A voluntary partial payment, in the form of either currency or merchandise, is in most states considered the best basis for acknowledgment of indebtedness, yet in some jurisdictions such payments do not affect the operation of the statute of limitations. On the other hand, a promissory note made and signed by a debtor, even though he may have no intention of honoring it, is an acknowledgment of the debt. The fact that the note may be utterly worthless, so far as payment is concerned, does not hinder the tolling of the statute of limitations.

A good plan to follow, if it is impossible to obtain partial payments or to get a note or a definite promise to pay in writing, is to reduce the claim to a judgment and take the chances of collection on the judgment over a longer period. Then, too, in a judgment a creditor has a sort of whip-hand over his debtor. In other words, every effort should be made to prevent a just claim from becoming outlawed.

True, even a judgment is sometimes difficult to collect, especially if a debtor is deliberately dishonest; but, if the amount is considerable and the debtor owns property or has a bank account, the chances are that at some time the judgment may be collected. A bank account may be garnished immediately after the judgment is obtained, provided the creditor knows that the amount in the bank equals or exceeds the amount of judgment. Property against which a judgment is filed cannot be sold until the judgment is satisfied.

The point, however, to be brought out in this article is that an account should never be permitted to die on one's hands. Every attempt should be made to keep it alive, even if it be by small partial payments or by definite promises, for when a debtor knows that his account is not "forgotten" nor "wiped off the books," there is always a chance of his coming in at some time and squaring up.

708 West Park Avenue

PRACTICAL HINTS

THIS DEPARTMENT IS NOW BEING CONDUCTED FROM THE OFFICE OF THE DENTAL DIGEST. TO AVOID UNNECESSARY DELAYS, HINTS, QUESTIONS AND ANSWERS SHOULD BE ADDRESSED TO EDITOR PRACTICAL HINTS, THE DENTAL DIGEST, 220 WEST 42D STREET, NEW YORK, N. Y.

NOTE—Mention of proprietary articles by name in the text pages of THE DENTAL DIGEST is contrary to the policy of the magazine. Contributions containing names of proprietary articles will be altered in accordance with this rule.

Editor, Practical Hints:

About nine months ago all teeth were extracted for a man about 50 years of age. Three months later full upper and lower dentures were constructed, which are satisfactory in every respect with the exception of an extremely dry feeling in the anterior palatal region. There is no irritation, no inflammation, no burning sensation.

F. E. P.

ANSWER.—The sensation your patient complains of may be interpreted as dryness but may be, instead, pressure on the palatine foramina, and it would be advisable to relieve these areas. Then, again, the sensation may be due to excessive suction. This of course, due to resorption, will adjust itself sooner or later.

Finally, there may be an actual dryness caused by some nervous condition reacting on the glands. This may be due to the strangeness of the dentures and may disappear as he grows accustomed to them, or it may be due to a more serious nervous condition, in which case he should go under the care of a physician.

Editor, Practical Hints:

I am submitting to you a case that has completely puzzled me:

A young married woman, aged 31, presented with the right lower second bicuspid in a traumatic condition. I treated it and filled the root, putting in a post to support the filling.

The tooth continued to be sore. I gave her gas and extracted it. Still she complained of pain. It is six or seven months since I extracted the tooth.

She now complains of a soreness in the right lower first molar and less soreness in the first bicuspid. She has an M. O. amalgam filling in the first molar and a D. O. and cervical amalgam in the first bicuspid.

I removed the filling in the molar and found the nerve alive. I put in a temporary cement filling, but there was no relief. The pain, she says, is of a throbbing character.

What would you suggest?

A. E. B.

ANSWER.—It must always be borne in mind that not infrequently a partially putrescent pulp will respond to

a vitality test, sometimes more vigorously than a normal pulp.

It would be advisable to check the occlusion carefully, not only in the rest position but also during the lateral excursions of the jaw. It will probably be found that this, at least, is a contributing cause of the trouble.

Editor, Practical Hints:

Will you kindly let me know the name of one or more soft waxes used for rebasing purposes, and also where they may be procured?

O. E. T.

Answer.—The wax most commonly used for rebasing is carding wax, the wax on which artificial teeth come from the manufacturer.

Editor, Practical Hints:

I should like to secure information regarding the effect of gas which was used during the War on the mouth and teeth at the time of being gassed and several years afterward. If articles have appeared in The Dental Digest before, I should appreciate it if you would refer me to them.

I have a patient who has lost all his teeth from some unknown cause. He is 32 years old, and there are no cavities in his teeth. He has been in ill health since the time he was gassed. Could it be from this cause? The occlusion was that of an average mouth.

F. N. H.

Answer.—We receive practically all the dental journals published in the English language, but we have never come across an article on the effect of gas on teeth. It would seem that if there were any relationship, something would have appeared before now. This does not mean, of course, that it is an impossibility.

Editor, Practical Hints:

Can you advise me what to do in a case where the tissue keeps breaking from the fingernails? The tissue will break back about one-fourth the length of the nail. On the forefinger, on the point, there is a cracked condition. I can clear this up just temporarily and soon it returns.

I have consulted doctors, but as yet they seem to be unable to clear it up permanently. This condition has existed for a period of over two years.

W. R. B.

Answer.—We are afraid that we shall be unable to help you in this case, since we have never heard of one like it. Presumably there is a possibility that novocain is the cause, but it is doubtful.

We shall be glad to publish your letter in the hope that some of our readers may be able to help you.

DENTAL SECRETARIES and ASSISTANTS

Secretaries' Questionnaire

All communications should be addressed to Elsie Grey, care of THE DENTAL DIGEST, 220 West 42d Street, New York, N. Y.

NOTE—HAVE YOU A BETTER WAY? HAVE YOU A TIME-SAVING SHORT-CUT? DO YOU KNOW A "STUNT" THAT LIGHTENS THE WORK OR MAKES FOR GREATER EFFICIENCY IN THE OFFICE? IF SO, WRITE TO ELSIE GREY. YOU MAY HELP MANY GIRLS WHO ARE BEGINNERS—AND YOU KNOW HOW YOU NEEDED HELP DURING YOUR FIRST FEW MONTHS IN A DENTAL OFFICE. PERHAPS YOU NEED HELP NOW. WRITE TO ELSIE GREY—SHE WILL HELP YOU.

Dear Miss Grey:

I have had a lot of help from your column, and I venture to ask for more.

What can I do to remove shoe-leather stains from my white hose?

M. H., Ala.

ANSWER.—Dilute one-half an ounce of oxalic acid in a pint of water and apply to the stains. Rinse and repeat until the stains have disappeared, then wash thoroughly or the acid will leave a mark of its own.

We are glad to know our column has been of benefit to you.

Dear Miss Grey:

I accidentally spilled some hydrochloric acid on one of the marble tops in the laboratory, and it has marred the surface. What can I do to restore it and remove the stain?

I am greatly interested in the Questionnaire, and it is the first thing I turn to when THE DENTAL DIGEST comes into the office.

R. A., Ga.

ANSWER.—Marble will quickly become marred by any type of acid, which, if allowed to remain on the surface for any length of time, will eat into it and dissolve it. To neutralize this effect, pour over the stains a neutralizing agent such as a solution of washing soda, bicarbonate of soda, borax or ammonia. To aid in restoring the polish, rub with powdered pumice moistened with water. It will take a lot of time and patience to restore the stained marble to a semblance of its former condition, and if the acid has been allowed to eat into it to any depth, you may not be able to eradicate the stain completely. It may be necessary to have the entire marble top refinished by a marble finishing concern.

Dear Miss Grey:

I am a dental assistant with several years of experience. The dentist in whose office I have been employed for the past two years is moving to California on account of his health, and

this makes it necessary for me to find another position. I have visited a number of offices to which my employer and some of his friends have referred me, and I wonder if I have just been "unlucky" or if the experiences which have come my way are prevalent. I really should like to know and I feel sure that with your wide contacts with assistants and dentists you can tell me. My question is this:

Why do dentists look upon the young woman who comes to them for a position as not worthy of any special consideration and, I might say, respect? This may sound rather harsh, but one does look for courteous and tolerant treatment from a professional individual, and it is rather disconcerting to be treated otherwise.

Also, why do dentists expect so much from their assistant and seem willing to give so little in return, both in financial compensation and in fair treatment? I base these questions on the following facts:

In all I have visited some 35 or 40 offices, both in my city and in near-by localities. I am 28 years old, comely in appearance, but not the prototype in either dress or appearance of a chorus girl or even a so-called "flapper." I graduated from high school and had one year of college plus a three months' course in a business school, taking secretarial training. I know that I am capable of doing good work in any dental office because of the actual experience I have had, and I feel sure that I am intelligent enough to adapt myself to any man's methods in a very short time. The dentists for whom I have worked have given me splendid references, three in number. With this background, made perfectly obvious to the dentists to whom I have applied for a position, the following has been the result:

Eleven of them were satisfied that I was just the person they were looking for and offered me a salary ranging from $12.00 to $18.00 a week, with hours from 8:30 in the morning to nine at night—the lower the salary, the longer the hours. Three were willing to give me one-half day a week off, one of these being a dentist who opened his office at nine in the morning and closed at 5:30 in the evening. When I protested that a respectable woman could not live on $12.00 or $15.00 a week, I was told that a dental assistant was not worth more than that, but they had no solution to offer on the cost of living, which I tried to explain by stating that I had to pay just as much for a loaf of bread or other necessities as they did. Several told me that it took from one to two years to train an assistant, no matter how much she knew, hence the low salary offered. Several invited me out to lunch or dinner to "talk things over" and seemed rather surprised when I told them I was looking for work and not entertainment. Well, I might go on telling you a lot more, but I think you can grasp the situation from what I have mentioned.

I have about decided to enter some other field of activity, as I feel certain that I am worth more than $12.00 or $15.00 a week to any business concern, but I cannot help but wonder how these same dentists would feel if their sister or daughter were compelled to earn her living under similar circumstances. I have talked with several assistants and

compared notes, and what they told me about their experiences in attempting to find a position has encouraged me to write to you, hoping that some advice may come our way that will help us all.

"PERPLEXED."

ANSWER.—This is a very interesting letter. Its contents are not entirely new to us, as we have heard much along similar lines before. We might express our opinion but prefer to leave this to our readers, both dentists and assistants. Something *is* wrong. What is it?

In this the final issue of the old DENTAL DIGEST we desire to thank our readers for their interest and help. We have appreciated the communications which have come to our desk containing helpful suggestions and ideas and also those that have spoken of the benefits derived from our columns, and we dare to hope that this effort on our part has really been helpful to the women who are serving dentistry in their respective fields, as well as to the dentists who may have been interested.

ELSIE GREY.

Dental Assistants' Societies

EDUCATIONAL AND EFFICIENCY SOCIETY FOR DENTAL ASSISTANTS, FIRST DISTRICT, NEW YORK, INC.

The Educational and Efficiency Society for Dental Assistants, First District, New York, Inc., will hold its regular meeting on Tuesday, December 8, 1931, at 7:45 P. M. at the Hotel Pennsylvania, 32nd Street and 7th Avenue, New York.

The Society has reached the tenth milestone on its journey along the roadway of success, and an exceptionally fine anniversary program has been arranged.

A cordial invitation is extended to the members of the dental profession and to their assistants.

THE DENTAL ASSISTANTS STUDY CLUB OF THE SECOND DISTRICT, STATE OF NEW YORK

The Dental Assistants Study Club of the Second District, State of New York, will hold its regular meeting on Friday, December 4, 1931, at 8 P. M., at the Second District Dental Society Clinic Rooms, 62 Hanson Place, Brooklyn, N. Y. The speaker of the evening will be Juliette A. Southard, of New York, Founder and former President of the American Dental Assistants Association, whose subject will be *Parliamentary Procedure.*

The second meeting of the month will be held on Friday, December 18, 1931, at 8 P. M., when Morris Cohen, D.D.S., of New York will speak on *Root-Canal Sterilization.*

All members of the profession and others who are interested are invited.

FUTURE EVENTS

THE EASTERN DENTAL SOCIETY OF THE CITY OF NEW YORK will hold its next regular meeting at the Allied Dental Council Auditorium, 425 Lafayette St., New York, on December 10, 1931.

The essayist will be William A. Squires, and his subject will be *Porcelain Jacket Crowns.* The discussion will be given by Milton Cohen.

S. A. Klein will lead the Round Table Discussion.

A series of clinics will be given by the following clinicians:

H. Spalding Both	George A. Malloy
Oscar J. Chase, Jr.	William Paul
Milton Cohen	Hayman Pines
Samuel Doskow	Bernard Seides
Samuel Eisner	William A. Spring

HERMAN SPITZ, *Chairman, Executive Board,*
207 Fourth Avenue, New York, N. Y.

THE MINNESOTA STATE BOARD OF DENTAL EXAMINERS will hold its next meeting at the University of Minnesota, December 11-19, 1931. For application and further information, address

WALTER H. SMITH, *Secretary,*
2337 Central Avenue, Minneapolis, Minn.

THE WESTCHESTER DENTAL SOCIETY will hold its third scientific session of the season at the Towers Hotel, 257 Valentine Lane, Yonkers, N. Y., Tuesday evening, December 15, 1931, at 8:30 P. M. sharp. The meeting will be a combined medical and dental session.

Theodor Blum, of New York, will give an address on *Oral Surgery of Interest to the Medical and Dental Profession.* H. R. Miller, of New York, will follow with a paper entitled *The Relation of Oral Focal Infection to the Medical Practice.*

All medical and dental practitioners residing in Westchester County are invited.

MORRIS WEINBERGER, *President,*
30 South Broadway, Yonkers, N. Y.

THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES will hold its Annual Meeting at the Palmer House, State and Monroe Streets, Chicago, December 21, 1931, at 4 P. M. sharp. The report of the officers will be given, a Board of Directors will be elected and such other business transacted as should come before the Association.

All members are urgently requested to be present.

By order of Board of Directors.

J. G. REID, *President,*
D. M. GALLIE, *Vice-President and Treasurer,*
E. W. ELLIOT, *Secretary.*

THE ALPHA OMEGA FRATERNITY will hold its Twenty-Fourth Annual Convention at the Statler Hotel, Buffalo, N. Y., December 25-27, 1931.

The first session will be held at 10 A. M. for registration. At 2 P. M. there will be a trip to Niagara Falls, then dinner and dancing.

There will be three days of business and social meetings at the Hotel Statler.

Reservations should be sent to

JACOB H. GREENBERG, *Chairman,*
Registration and Reception Committee,
490 Grant St., Buffalo, N. Y.

THE CHICAGO DENTAL SOCIETY extends a hearty and cordial invitation to all members of the American Dental Association and to members of recognized foreign dental associations to attend its Sixty-Eighth Annual Midwinter Meeting, which is to be held at the Stevens Hotel, Chicago, January 18-21, 1932.

The Program Committee, under the direction of Irwin G. Jirka, Chairman, is developing a comprehensive and diversified program which will challenge the attention and interest of every dentist in attendance, whether he is a general practitioner or engaged in specialized practice.

The Exhibit Hall will, as always, be a center of attraction and interest. All ethical manufacturers and dealers allied with the profession are invited to participate.

Please address all communications and application for space to the office of the Exhibit Committee, Chicago Dental Society, 185 North Wabash Ave., Chicago.

CHARLES R. BAKER, *President,*
HOWARD C. MILLER, *Secretary,*
185 North Wabash Ave., Chicago, Ill.

THE DELAWARE STATE BOARD OF DENTAL EXAMINERS will hold its next meeting at the Municipal Building, Tenth and Kings Sts., Wilmington, Del., January 20-21, 1932, from 9 A. M. to 5 P. M.

For further information, address,

W. S. P. COMBS, *Secretary,*
Middletown, Del.

THE DENTAL CLINIC CLUB OF PHILADELPHIA

ANNUAL FEBRUARY CLINICS

Because of the popular demand the Annual February Clinics of the Dental Clinic Club of Philadelphia for 1932 will consist of a course in Oral Surgery, Exodontia, Anesthesia and Radiography only.

The course is scheduled to begin Tuesday morning, February 16, 1932, at 9 A. M. and will continue through Wednesday, Thursday and Friday, concluding at 5 P. M. on Friday, February 19th.

The lecturers and clinicians for the course will include such prominent and outstanding men in the profession as:

James E. Aiguier	Roy Ennis
W. J. Asprey	John Gunter
Lawrence Curtis	M. Hagopian
George Davis	Robert Ivy
L. Biddle Duffield	D. C. Turkington

Due to the expected heavy registration, it has been decided to limit the memberships to the course. Reservations should be addressed at an early date to

JOHN H. YEARICK, *Secretary,*
4908 Wayne Avenue, Philadelphia, Pa.

THE MINNESOTA STATE DENTAL ASSOCIATION will hold its Forty-ninth Annual Meeting at the new Municipal Auditorium, St. Paul, Minn., February 24-26, 1932. All members of the American Dental Association or recognized foreign dental organizations are invited.

L. M. CRUTTENDEN, *Secretary,*
435 Hamm Bldg., St. Paul, Minn.

THE KINGS COUNTY DENTAL SOCIETY is completing elaborate plans for the gala celebration of its Twentieth Anniversary to be held at Hotel St. George, Brooklyn, N. Y., February 25-27, 1932.

The various committees have obtained dentistry's foremost clinicians, lecturers and round-table discussors. A complete series of postgraduate lectures will be given, as in previous years. The academic schedule is to be concluded with a huge social affair, a dinner-dance, in the main ballroom, with its beautiful colorama, of the Hotel St. George. Professional entertainers, better than ever before, are being secured.

A cordial invitation is extended to every ethical dentist to join in this happy celebration. Watch for further announcements.

MATTHEW D. LEVIN,
Chairman, Publicity Committee,
201 Eastern Parkway, Brooklyn, N. Y.

THE CONNECTICUT STATE DENTAL ASSOCIATION will hold its Sixty-Eighth Annual Meeting at the Troup Junior High School, New Haven, Conn., March 30-April 1, 1932.

C. W. VIVIAN, *Secretary,*
New Britain, Conn.

THE MASSACHUSETTS DENTAL SOCIETY will hold its Sixty-Eighth Annual Meeting at the Hotel Statler, Boston, Mass., May 2-5, 1932.

WILLIAM H. GILPATRIC, *President,*
358 Commonwealth Ave., Boston, Mass.
PHILIP E. ADAMS, *Secretary,*
236 Newbury St., Boston, Mass.

THE DENTAL SOCIETY OF THE STATE OF NEW YORK will hold its Sixty-Fourth Annual Meeting at Hotel Ten Eyck, Albany, N. Y., May 11-13, 1932. A cordial invitation is extended to all members of state societies, Canadian societies and ethical dentists.

The officers and committees will present a program which we trust will enlist the attention of all dental practitioners.

H. J. Burkhart, 800 East Main Street, Rochester, N. Y., is Chairman of the Program Committee; E. W. Briggs, 1118 Madison Avenue, Albany, N. Y., Chairman of the Exhibits Committee; and Dr. E. Hurley, 80 Fourth Street, Troy, N. Y., Chairman of the Clinics Committee.

For further information, address

A. P. BURKHART, *Secretary,*
57 East Genesee St., Auburn, N. Y.

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A little extra cash won't hurt . . You know where to get it, if you have any precious metal scrap lurking around your office, - - - - - from THE J. M. NEY COMPANY. Make an early hunt this year, to be ready for early Christmas shopping.

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IF you needed the finest of dentures so that your patients and friends would never suspect that you had lost your natural teeth, would not you and your dentist decide that the very latest scientific production in artificial teeth was indicated for your case?

It is almost certain that your dentist would want to do something fine for you. His interest, his pride, and the knowledge that others would eventually know that he did the work would make him anxious to choose teeth that would supplement his skill and not act as a handicap.

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—the greatest aid to skilful dentists

Please bear in mind that most patients have the same fundamental desires that govern you. Sometimes they do not understand them or cannot express them in your words. They are *all* interested in Appearance just as you are, but all are not aware of the influence of teeth on Appearance—*until after the dentures are made!* Then you will find many who will criticize the Appearance of the teeth, forgetting that they handicapped you by failing to cooperate.

You can do much to forestall such trouble and to build reputation and prestige for yourself if you will use your knowledge of dentistry and human nature when selecting teeth for the case.

There is only a few cents' difference in cost anyway, and if patients only knew the great difference in Appearance and Efficiency, there would never be anything used but the *original* Trubyte and *New* Trubyte.

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Every dentist should try Dioxogen.

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EDITOR'S CORNER

Farewell As Editor

THE DENTAL DIGEST has had two major purposes during its career under the present publishers, which began with the January, 1909, issue. Both have become so interwoven into the fiber of current professional thought that they can be safely left to their own momentum. It is therefore fitting that the magazine should pass into the possession of new owners with new purposes.

The first purpose was to bring dental economics out of the background of thought into which a mistaken conception of dental ethics had crowded it, to turn upon it the full light of critical investigation and to give it such form and function as would make it most effective in improving service for patients and securing for dentists that reward to which faithful servants are entitled. This subject, which was anathema then, is now popular. The very society which in 1909 ejected the editor from the floor for trying to present a few simple truths assembled a very large audience in 1929 and sat for two hours in rapt attention. Teachers of the subject now blossom in every corner of the land.

The second purpose was to bring science and profit and honor to denture service. At the beginning of 1909 this service had none of these characteristics. A little group of devoted teachers, including Gritman in Philadelphia, Gysi in Zurich, Prothero in Chicago, Snow in Buffalo, Williams in London, Wilson in Cleveland and others less well known, was struggling to teach sound prosthetic principles to a profession that did not care and would not listen. There was hardly a scientific prosthetic method or appliance as we now know them.

In the absence of all knowledge of what it costs a dentist to render service, unintelligent competition among dentists on a price basis had lowered the fee for a full denture until it averaged about $10.00 in the cities and $7.50 in many smaller communities. From this sum there was often deducted the amount received for the extractions necessary to make the denture possible.

Dentures made by the methods then in vogue were so uniformly unsatisfactory, had to be remade so often, consumed so much time and called down upon dentists such persistent unfavorable comment that even dentists who were financially unobserving could see that this form of service caused loss rather than profit. Just previous to 1909 there was a serious discussion in the profession as to the wisdom of divorcing denture work from professional dentistry and leaving it to any one who cared to practice it.

Dental Economics and Prosthetic Science, working together, made Professional Denture Service possible. This form of service has a steadily growing

host of friends. It is now possible for denture patients in nearly all parts of this country to obtain a quality of denture service unknown anywhere in the world in 1909. There are denture specialists earning now, annually, sums almost unknown to the dental profession at the beginning of this century.

Fees for denture service are still too low among those dentists who will not perceive that the best possible denture service is most economical for patients and profitable for them, and that the lower the fees the more scientific the service must be from beginning to end if it is to show a profit. It is gradually being seen that professional denture service, when combined with good office management, may be the most profitable division of general dental practice, especially in the dentist's later years.

Of course the magazine has served many minor purposes. Perhaps the most dramatic of these was getting the Bauman case thrown out of court. Dr. Bauman, a dentist, had been, as the editors believed, unjustly convicted of malpractice, largely through testimony given by two New York dentists. The opinion of some of the most substantial men in the dental profession held this testimony to be scientifically misleading and unwarranted. Competent legal advice was to the effect that if the verdict which the jury had rendered was allowed to stand, it would be necessary for each dentist to secure from each patient at the beginning of each operation a written release similar to that now required by hospitals before major operations. The only alternatives were that the dentist should have no property in his own name or should maintain a legal staff capable of defending him.

The publishers of this magazine placed a large sum of money at the disposal of the editorial staff to see what could be done to free the profession from such danger. The testifying dentists were persuaded to retract their testimony, the case was compromised, the record was cleared, the profession was free, and Dr. Bauman was saved $20,000 damages which he would have had to pay out of his own pocket. He was not a subscriber to this magazine nor a customer of the publishers.

Since 1909 the magazine has enjoyed world-wide favor among dentists, as favor is shown by subscription lists. "Brother Bill," writing from his heart, won the hearts of others, until, when the efforts in behalf of the magazine were greatest, its subscribers were equal in number to half of the dentists in the United States. In connection with the magazine certain books were issued. They have gone to the uttermost parts of the earth and have taken a place in dental literature.

Perhaps no editor who lives to lay down his pen at the conclusion of his part in some worth-while task to which he set himself does so without feelings of mingled relief and regret. Among the thankless tasks of the world editorship

is entitled to high place. If perchance the editor satisfies some one, that one takes it for granted. Is not that the thing for which he paid his money? If the editor does violence to some one's preconceptions—perhaps in a subject of which the preconceiver knows nothing and on which the editor may have spent half a lifetime—he may be shot from any ambush with any weapon from a niblick to a howitzer. There is no closed season on editors.

The editor's month seems to contain only fifteen days. Hardly is one article out from under his pen before the make-up man is calling for another. Especially is this true when serial articles are intended to carry forward consecutive thought. No editor needs to have the story of the sword of Damocles explained to him.

On the other hand, the editor has compensations. If he hears the "inner voice" and tries to be true to it, he will live in the conviction that his efforts will become a part of the constructive work which is slowly making the world a better place in which to live, he will be given the privilege of cooperating with others who are working with similar purpose and will find them a continuing joy and inspiration, associates will gather around who will bear with his weaknesses and make his work better than he could make it himself, and once in a while a reader will take enough time from his daily tasks to write that his life has been made better or more effective by what the magazine has done.

The writer hopes to take part in a form of service now coming into the foreground of professional thought. Twenty years ago he dreamed of a day when dental education of the public could begin. But the time was not then ripe. The years from then until now have been years of preparation for all of us. The studies in economics and into the differences between dentistry as a craft with a narrow vision, an unattractive story and a limited future and dentistry as a profession with wide vision, one of the most persuasive of all stories and an unlimited future have had immediate objectives, but they have also been getting us ready for bigger work.

Dentistry as a craft has erected a wall of high fees which has shut service away from many of the public and profits away from many dentists. Professional dentistry builds no such wall. A wise combination of professionalism and sound economics can be made to produce a plan of office conduct which makes surprisingly low fees for the best of dental service more profitable to the average practitioner than there is the slightest hope that his practice can be on the present basis.

The writer has been given opportunity to make addresses before lay audiences—especially service clubs—pretty well around the United States. Never has an audience failed to show the keenest interest, and there has often been aroused increased attention to professional dentistry.

Through the courtesy of the National Broadcasting Company, and under the auspices of organized dentistry, four broadcasts on dental hygiene have been made over a twenty-station chain, and others may be given. If we learn to tell

dentistry's story well, we can make our future about what we like. If we are indifferent, we shall deserve whatever fate overtakes us.

This valedictory could not be properly concluded without giving credit by name to those to whom the major part of the credit for whatever worth-while things this magazine has done in recent years is largely due. Most of its readers are familiar with the names of Dr. Lawrence W. Dunham, who has been for years a veritable tower of strength, and Dr. Allan M. Johnson, who has done invaluable work for the past five years as Associate Editor. But not so many know of Miss Abercrombie, the editor's efficient and untiring secretary, and Mr. Gounod, for thirteen years make-up man, who gave the magazine the form in which it is issued each month. To these and others who have helped are extended the writer's heartfelt thanks.

And so, since the magazine has served the purposes for which the publishers took it over, this editor lays down his pen after twenty-two years and the magazine passes to other publishers while it is still one of the great dental magazines with many thousands of subscribers and, we hope, friends.

The new owners have some excellent plans for a bigger and better magazine. We wish them the fullest measure of success and bespeak for them your friendship and cooperation.

The editorial staff, in bidding you official but not personal farewell, hopes that each of you, when his time comes, may be able to review his life and find it successful in the terms outlined by one of the editor's classes in dental economics, as follows:

> "We believe that a dentist is successful when he can look back upon years of intelligent and conscientious effort, and when he enjoys a financial condition which insures comfort and permits a reasonable amount of unpaid work for God, profession and country and a sane mind in a sound body."

GEORGE WOOD CLAPP.

An Announcement to Dental Digest Subscribers

As previously announced, this is the last issue of THE DENTAL DIGEST under its present management. Beginning with the 1932 volume it will be published by Dental Digest, Inc., of Pittsburgh, Pennsylvania, and will appear in an entirely new format and editorial style.

Many of you have subscribed to THE DENTAL DIGEST throughout your whole professional careers. To you it has been more than paper, ink and ideas. It has been a teacher, a friend—almost a living personality. Because of this, the new publishers hope that they may be entrusted with a continuance of that friendship and will earnestly endeavor to merit your good-will and support.

You have been notified of the special inducement to present subscribers, and if you have not returned the post-card or ordered through your dealer, please do so at once in order that we may reserve for you a copy of the first issue of the magazine in its new form. The coupon is for your convenience.

THE DENTAL DIGEST
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I am at present a subscriber to THE DENTAL DIGEST and want you to continue my subscription at the renewal rate of $1.00.

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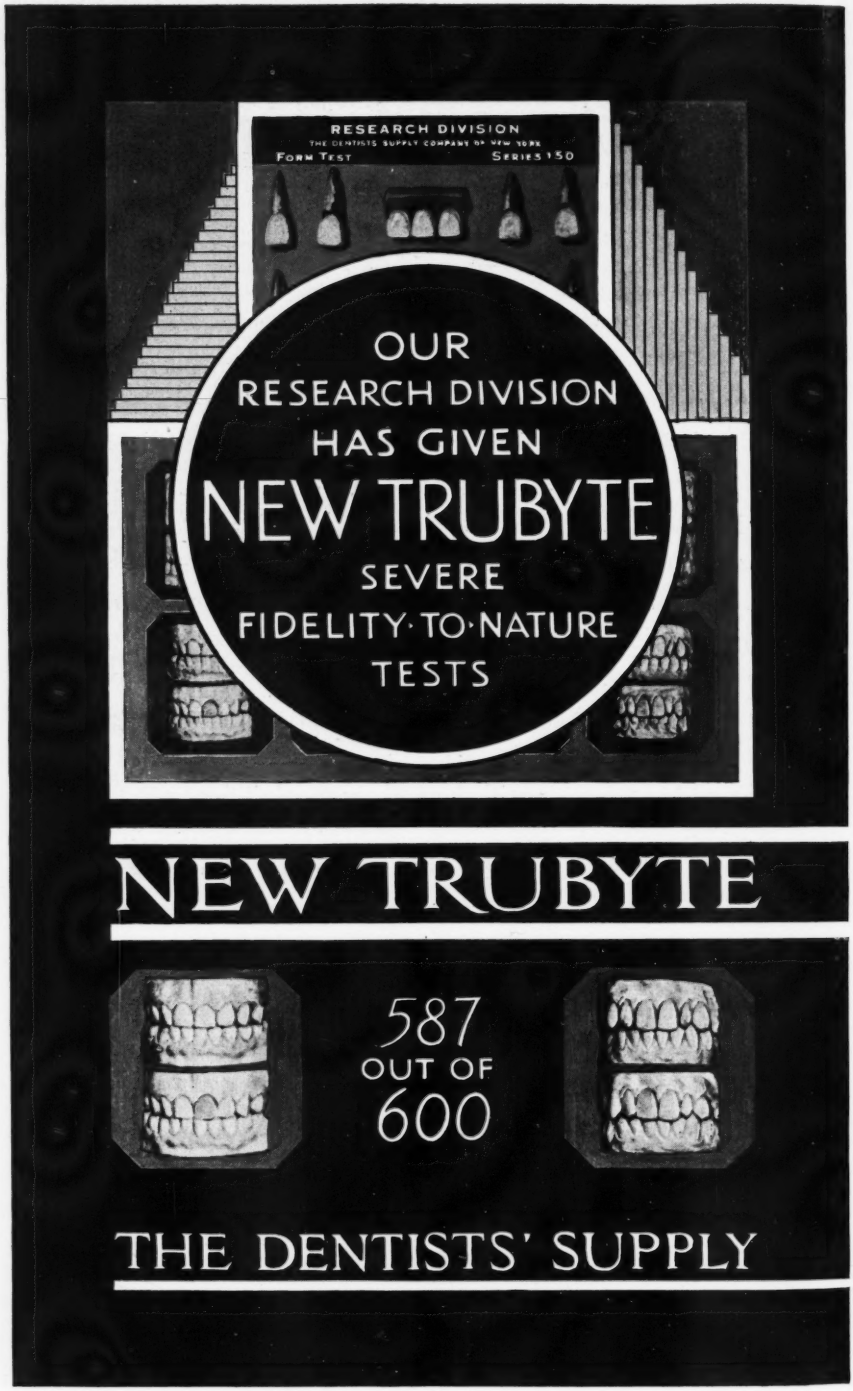
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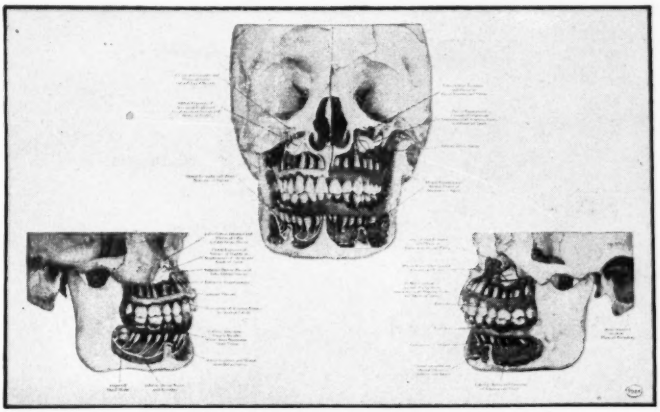

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Note to Dental Students:

Students at accredited dental schools may also receive the above chart without cost by sending name, address and school.

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Use your "Natural" Tooth Color Guide for every case. Especially if you send your work to a laboratory, use it. You know best the color effects desired, and this will assure dentures that will please both you and your patients.

S. S. White "Natural" Teeth

Their colors are the result of the most intensive tooth color investigation ever conducted.

Combination set of 14 . . $2.60

Combination set of 14 in $100.00 lots . . per set $2.34

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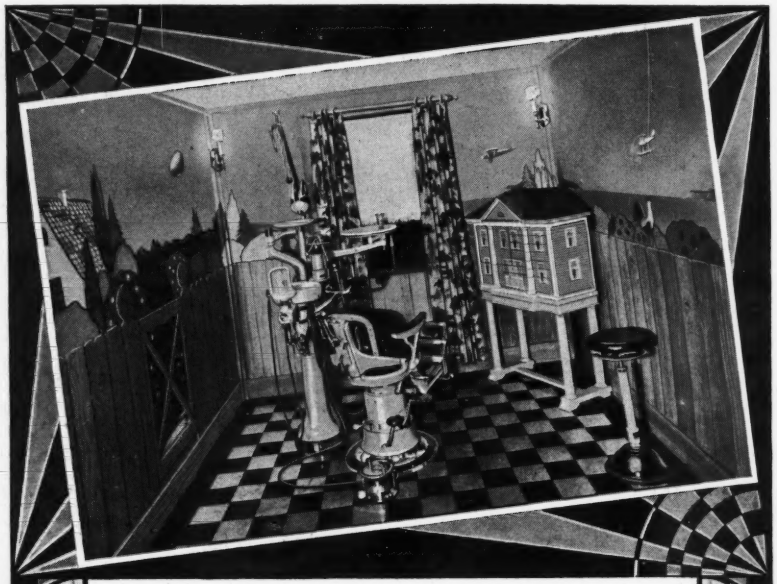

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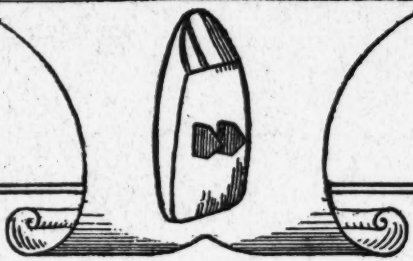

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If you will accept the foregoing facts and make them serve you as they should, your patients will look their parts and act them in rewarding you.